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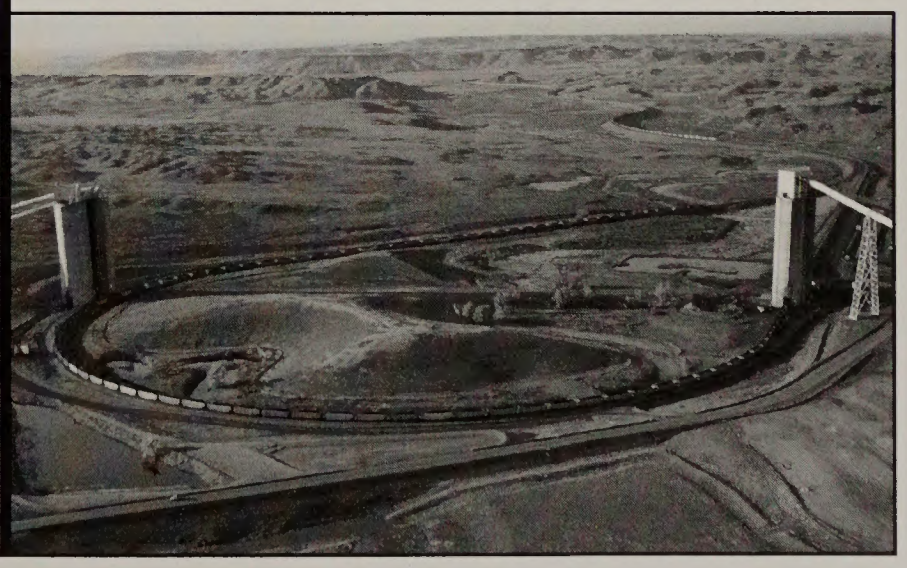
# FINAL
# Environmental Impact Statement for the Wright Area Coal Lease Applications

## Volume 2 of 2
## Chapters 5 - 8 and Appendices

*West Loadout Facilities*
*Black Thunder Mine, Wyoming*

*Elk on Reclaimed Rangeland*
*Jacobs Ranch Mine, Wyoming*

*Elk on Reclaimed Rangeland*
*Black Thunder Mine, Wyoming*



*Loadout Facilities in Porcupine Creek Valley*
*North Antelope Rochelle Mine, Wyoming*

**July 2010**

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**NATIONAL SYSTEM OF PUBLIC LANDS**

BLM

Wyoming State Office – High Plains District

The BLM manages more land – 253 million acres – than any other Federal agency. This land, known as the National System of Public Lands, is primarily located in 12 Western States, including Alaska. The Bureau, with a budget of about $1 billion, also administers 700 million acres of sub-surface mineral estate throughout the nation. The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

BLM/WY/PL-10/022+1320

#659860140 ID 88067573 HD 243 .W8 W75 2010 v.2



# 5.0 CONSULTATION AND COORDINATION

In addition to this Environmental Impact Statement (EIS)[1], other factors and consultations are considered and play a major role in determining decisions on the proposed lease applications. These are included in the following.

## Regional Coal Team Consultation

The four coal lease applications included in this EIS were reviewed and discussed at Powder River Regional Coal Team (PRRCT) public meetings held on April 19, 2006, in Casper, Wyoming (North Hilight Field, South Hilight Field, West Hilight Field, and West Jacobs Ranch tracts), and on January 18, 2007, in Casper, Wyoming (North and South Porcupine tracts). The North and South Hilight Field tracts were applied for in a single application, and the North and South Porcupine tracts were applied for in a single application. Each of the applicants presented information about their existing mines and pending lease application to the PRRCT at those meetings. Voting and nonvoting members of the PRRCT include the governors of Wyoming and Montana, the Northern Cheyenne Tribe, the Crow Tribal Council, the U.S. Department of Agriculture - Forest Service (USFS), Office of Surface Mining Reclamation and Enforcement, U.S. Fish and Wildlife Service, National Park Service, and U.S. Geological Survey. The PRRCT determined that the lands in the four applications met the qualifications for processing as production maintenance tracts. The PRRCT recommended that the Bureau of Land Management (BLM) continue to process all four lease applications.

## Governor's Consultation

The BLM Wyoming State Director notified the Governor of Wyoming on April 27, 2006, that Ark Land Company had filed a lease application with BLM for the North and South Hilight Field Lease by Application (LBA) Tracts. The BLM Wyoming State Director notified the Governor of Wyoming on February 2, 2006, that Ark Land Company had filed a lease application with BLM for the West Hilight Field LBA Tract. The BLM Wyoming State Director notified the Governor of Wyoming on September 18, 2006, that Jacobs Ranch Coal Company had filed a lease application with BLM for the West Jacobs Ranch LBA Tract. The BLM Wyoming State Director notified the Governor of Wyoming on March 14, 2007, that BTU Western Resources, Inc. had filed a lease application with BLM for the North and South Porcupine LBA Tracts.

## Public Notice

BLM published a Notice of Intent to prepare an EIS and Notice of Public Scoping Meeting in the *Federal Register* on July 3, 2007, in the Gillette News-Record on July 6, 2007, and in the Douglas Budget on July 11, 2007. The publications served as public notice that the Hilight Field, West Hilight Field, West Jacobs

[1] Refer to page xxvii for a list of abbreviations and acronyms used in this document.

Ranch, and Porcupine coal lease applications had been received, announced the time and location of a public scoping meeting, and requested public comment on the four applications. Letters requesting public comment and announcing the time and location of the public scoping meeting were mailed to all parties on the distribution list on July 11, 2007.

At the public scoping meeting, which was held July 24, 2007 in Gillette, Wyoming, the applicants orally presented information about their mines and their need for the coal. The presentations were followed with a question and answer period, during which three oral comments were made. The scoping period extended from July 3 through September 3, 2007, during which time BLM received nine comment letters.

The U.S. Environmental Protection Agency (EPA) published a notice announcing the availability of the Draft EIS in the *Federal Register* on June 26, 2009. The BLM published a Notice of Availability and Notice of Public Hearing for the Draft EIS in the *Federal Register* on July 8, 2009, in the Douglas Budget newspaper on July 8, 2009, and in the Gillette News-Record newspaper on July 8, 2009. The 60-day comment period on the Draft EIS ended 60 days following EPA's Notice of Availability (August 25, 2009). A formal public hearing was held on July 29 at 7:00 p.m. at the Clarion Inn in Gillette, Wyoming to solicit public comments on the Draft EIS, the fair market value, the maximum economic recovery, and the proposed competitive sale of coal from the six LBA tracts. Two individuals representing organizations presented statements on the Draft EIS during the hearing, and written comments were received from 17 individuals, agencies, businesses, and organizations, as well as over 500 e-mails from interested individuals and entities during the comment period. A summary of the statements that were presented at the public hearing and the public comments, with agency responses, are included as Appendix I of this Final EIS.

Parties on the distribution have been sent copies of the completed Final EIS, and the EPA and BLM will publish Notices of Availability for the Final EIS in the *Federal Register*. After a 30-day availability period, BLM will make separate decisions to hold or not to hold a competitive lease sale for the federal coal in each of these six LBA tracts. A separate Record of Decision (ROD) will be prepared and signed for each of the tracts. Copies of each ROD will be mailed to parties on the mailing list and others who commented on this EIS during the National Environmental Policy Act (NEPA) process. There will be a 30-day appeal period after each ROD is signed before the ROD is implemented. If lands administered by the USFS are included in the tracts that are offered for lease, the USFS will prepare and sign a separate consent decision for each tract. Applicable USFS regulations for appeal will be followed.

**Department of Justice Consultation**

After each competitive coal lease sale, but prior to issuance of a lease, BLM will solicit the opinion of the Department of Justice on whether the planned lease

issuance creates a situation inconsistent with federal anti-trust laws. The Department of Justice is allowed 30 days to make this determination. If the Department of Justice has not responded in writing within the 30 days, BLM can proceed with issuance of the lease.

## Other Consultations

Other federal, state, local, and Native American governmental agencies that have been consulted in preparation of this EIS or will be consulted prior to making a decision to hold or not to hold a federal coal lease sale are listed in the following tables.

## Contributors, Reviewers, and Preparers

This EIS was prepared by WWC Engineering, a third-party contractor, under the direction of the BLM. Representatives from cooperating agencies reviewed and contributed to the EIS. Tables 5-1 and 5-2 provide listings of the BLM, cooperating agency, and third-party consultant personnel who prepared and reviewed this EIS.

## Distribution List

This EIS was distributed to Congressional offices, federal agencies, state governments, local governments, industry representatives, interest groups, and individuals for their review and comment (Table 5-3).

Table 5-1. List of Contributors and Reviewers.

| Name | Project Responsibility |
|---|---|
| **BLM High Plains District Office** | |
| Mike Karbs | Coal Program Supervisor |
| Sarah Bucklin | Wright Area EIS Project Manager, Wildlife, T&E Species |
| Teresa Johnson | Environmental Protection Specialist |
| Ginger Vickers | Legal Assistant, Distribution List |
| Mike Brogan | Water Resources |
| **BLM Wyoming State Office** | |
| Brenda Neuman | Coal Program Coordination |
| Bob Janssen | Coal Program Coordination |
| Ken Peacock | NEPA Coordination |
| Janet Kurman | NEPA Coordination |
| Mavis Love | Land Adjudication |
| Larry Jensen | Socioeconomics |
| Steve Hageman | Minerals Appraiser |
| Bill Hill | General Resources |
| Dennis Saville | Wildlife |
| Dale Hansen | Paleontology |
| Melissa Hovey | Air Quality |
| John Zachariassen | Air Quality and Climate |
| Rick Schuler | Water Resources |
| Ranal Capron | Cultural |
| **BLM Wyoming Reservoir Management Group** | |
| Al Elser | Petroleum Geology |
| Dwain McGarry | CBNG Geology |
| Lee Almasy | CBNG Reservoir Engineering |
| Dave Chase | Minerals |
| **BLM Buffalo Field Office** | |
| Tom Bills | EIS Liaison |
| Clint Crago | Cultural, Paleontology |
| Buck Damone | Cultural |
| Kay Medders | Rangeland |
| Jerry Queen | Geology, Minerals, Mining Claims |
| Chris Durham | Wildlife, T&E Species, BLM Sensitive Species |
| Don Brewer | Wildlife |
| **USDA Forest Service** | |
| Misty Hays | Deputy District Ranger, Socioeconomics, Range |
| Mike Fracasso | EIS Liaison, Geology, Minerals, Paleontology |
| Ian Ritchie | Cultural |
| Daneille Reboletti | NEPA Coordination |
| Charlie Bradshaw | Vegetation, Range, Weeds |
| Moriah Shadwick | Vegetation, Range, Weeds |
| Kathy Roche | Botany, T&E Plants, USFS Sensitive Plant Species |
| Tim Byer | Wildlife, T&E Animals, Management Indicator Species |
| Catherine Willard | Fisheries, Amphibians, Reptiles |
| Shawn Anderson | Fisheries, Amphibians |
| Dave Gloss | Water Resources, Wetlands |
| Greg Eaglin | Air Quality |
| Randy Tepler | Soils |
| Marcia Rose-Ritchie | Land Use, Recreation |
| Jeff Tupala | Visual |
| Amy Ormseth | Hazardous Waste, Transportation |

Table 5-1. List of Contributors and Reviewers (Continued).

| Name | Project Responsibility |
|---|---|
| **BLM National Science and Technology Center (Powder River Basin Coal Review)** | |
| Craig Nicholls | Air Quality and Climate |
| Paul Summers | Water Resources |
| **Office of Surface Mining Reclamation and Enforcement Western Regional Coordinating Center** | |
| Foster Kirby | Archaeologist, EIS Cooperating Agency Representative |
| **Board of Converse County Commissioners** | |
| James H. Willox | EIS Cooperating Agency Representative |
| **Wyoming Department of Transportation** | |
| Larry Konetzki | EIS Cooperating Agency Representative |
| **University of Wyoming** | |
| Bonnie Heidel | Wyoming Natural Diversity Database Botanist |
| Ron Hartman | Rocky Mountain Herbarium Curator |
| B. Ernie Nelson | Rocky Mountain Herbarium Manager |
| **ENSR International (Powder River Basin Coal Review)** | |
| Valerie Randall | Project Manager |
| Dolora Koontz | Assistant Project Manager and Task 2 Manager (Existing Development and Reasonably Foreseeable Development) |
| Eldon Strid, Matt Reilly | Existing and Projected Coal Development and Coal Transportation Scenarios |
| Doree Dufresne | Database Development |
| Bruce MacDonald, PhD | Air Quality |
| Robert Berry, PhD | Water Resources |
| James Rumbaugh | Ground Water Modeling |
| Brad Anderson | Surface Water |
| Ron Dutton, George Blankenship | Socioeconomics |
| Bernhard Strom | Land Use, Transportation, and Utilities |
| William Berg | Topography, Geology, and Minerals |
| James Burrell, James Nyenhuis | Soils and Alluvial Valley Floors |
| Jon Alstad | Vegetation, Wetlands, and Grazing |
| Charles Johnson | Wildlife |
| Rollin Daggett | Fisheries |
| Kim Munson | Native American Concerns and Paleontology |
| **Wyoming Department of Environmental Quality (WDEQ) Office of Outreach Services** | |
| Dan Clark | Ombudsman, EIS Liaison |
| **WDEQ Land Quality Division** | |
| Don McKenzie | Administrator |
| Kathy Muller Ogle | CHIA Program Supervisor |
| Mark Rogaczewski | District Three Supervisor |
| Anna Waitkus | Senior Analyst |
| Doug Emme | Blasting Program Principal |
| **WDEQ Air Quality Division** | |
| Kelly Bott | Engineer/EIS Cooperating Agency Division Representative |

Table 5-1. List of Contributors and Reviewers (Continued).

| Name | Project Responsibility |
|---|---|
| **WDEQ Water Quality Division** | |
| John Wagner | Water Resources |
| **Wyoming Game and Fish Department** | |
| John Emmerich | Deputy Director – External Programs |
| **Wyoming State Planning Office** | |
| Steve Furtney | Coal Issues Coordination/Cooperating Agency Representative |

Table 5-2. List of Preparers.

| Name | Education/Experience | Responsibility |
|---|---|---|
| **BLM High Plains District Office** | | |
| Mike Karbs | M.S., B.S. Mineral Engineer, Public Policy, 34 years professional experience | Coal Program Supervisor |
| Sarah Bucklin | M.S. Candidate Zoology, B.S. Biology, Nationally Certified Wildlife Biologist, 11 years professional experience | EIS Project Manager |
| **WWC Engineering (Third-Party Contractor)** | | |
| Ken Collier | B.S. Geology, 33 years professional experience Licensed Wyoming Geologist | EIS Project Manager Report Preparation |
| John Berry | B.S. Wildlife Biology, 33 years professional experience | Report Preparation |
| Heidi Robinson | 18 years professional experience | Document Production |
| Mal McGill | 12 years professional experience | CADD/Figures Preparation |

**Subcontractors**

| Resource Responsibility | For ALC: North, South and West Hilight Field Tracts |
|---|---|
| Geology/Mineral Resources | Habitat Management, Inc., Gillette, WY |
| Air Quality | Knight Technologies, Inc., Gillette, WY |
| Water Resources | WWC Engineering, Sheridan, WY |
| Alluvial Valley Floors | Habitat Management, Inc., Gillette, WY |
| Wetlands | Knight Technologies, Inc., Gillette, WY |
| Soils | BKS Environmental Associates, Inc., Gillette, WY |
| Vegetation | Habitat Management, Inc., Gillette, WY |
| Wildlife | Thunderbird-Jones and Stokes, Gillette, WY |
| Land Use/Ownership | Habitat Management, Inc., Gillette, WY |
| Cultural | GCM Services, Inc., Butte, MT |
| Visual | Knight Technologies, Inc., Gillette, WY |
| Paleontology | Arcadis U.S., Inc., Buffalo, WY |
| Socioeconomics | WWC Engineering, Laramie, WY |

| Resource Responsibility | For JRCC: West Jacobs Ranch Tract |
|---|---|
| Geology/Mineral Resources | Aqua Terra Consultants, Sheridan, WY |
| Water Resources | Aqua Terra Consultants, Sheridan, WY |
| Alluvial Valley Floors | Aqua Terra Consultants, Sheridan, WY |
| Wetlands | Aqua Terra Consultants, Sheridan, WY |
| Soils | Intermountain Resources, Laramie, WY |
| Vegetation | Intermountain Resources, Laramie, WY |
| Wildlife | Intermountain Resources, Laramie, WY |
| Land Use/Ownership | Aqua Terra Consultants, Sheridan, WY |
| Cultural/Paleontology | GCM Services, Inc., Butte, MT |
| Socioeconomics | WWC Engineering, Laramie, WY |

| Resource Responsibility | For BTU: North and South Porcupine Tracts |
|---|---|
| Soils | BKS Environmental Associates, Inc., Gillette, WY |
| Vegetation | BKS Environmental Associates, Inc., Gillette, WY |
| Wildlife | Thunderbird-Jones and Stokes, Gillette, WY |
| Cultural | GCM Services, Inc., Butte, MT |
| Paleontology | Arcadis U.S., Inc., Buffalo, WY |
| Socioeconomics | WWC Engineering, Laramie, WY |

Table 5-3. BLM Distribution List for the Wright Area Final EIS.

**Federal and State Officials**

Governor of Montana Brian Schweitzer
Governor of Wyoming Dave Freudenthal
Representative Dave Edwards
Representative Erin Mercer
Representative Sue Wallis
Representative Timothy Hallinan
Representative Thomas Lubnau
Senator Jim Anderson
Senator John Hines
Senator Michael Von Flatern
US Congresswoman Cynthia M. Lummis
US Senator John Barrasso
US Senator Mike Enzi

**Federal Agencies**

BLM Library, Denver, CO
BLM, Buffalo, WY
BLM, Casper, WY
BLM, Cheyenne, WY
BLM, Miles City, MT
BLM, Montana State Office, Billings, MT
BLM, Washington, DC
Bureau of Indian Affairs, Washington, DC
Department of Energy, Casper, WY
Department of Energy, Washington, DC
Department of Interior, Denver, CO
Devils Tower National Monument
Medicine Bow National Forest, Laramie, WY
Mineral Management Bureau, Helena, MT
MMS, Denver, CO
MMS, Herndon, VA
National Park Service, Denver, CO
NPS - Air Resources Division, Denver, CO
NPS, Washington, DC
NRCS, Douglas, WY
OEPC, Denver, CO
OSM Library, Denver, CO
OSM, Casper, WY
OSM, Denver, CO
OSM, Washington, DC
Rocky Mountain Regional Solicitor
US Army Corps of Engineers, Cheyenne, WY
US EPA, Denver, CO
US EPA, Washington, DC
US Fish & Wildlife Service, Arlington, VA
US Fish & Wildlife Service, Cheyenne, WY
US Geological Survey, Cheyenne, WY
US Geological Survey, Denver, CO
US Geological Survey, Reston, VA
US Government Printing Office, Washington, DC
USDA – FS, Douglas Ranger District, Douglas, WY
USDA Forest Service, Douglas, WY
USDA Forest Service, Golden, CO
USGS Water Resources Division, Cheyenne, WY

**Wyoming State Agencies**

Department of Agriculture
Department of Education
Department of Employment, Research & Planning
Department of Transportation
Economic Analysis Division
Game & Fish Department, Cheyenne
Game & Fish Department, Lander
Game & Fish Department, Sheridan
Office of the State Treasurer
Office of State Lands & Investments
O & G Conservation Commission
Parks & Cultural Resources Department
Public Service Commission
State Engineer's Office
State Geological Survey
State Historic Preservation Office
State Land Office
State Planning Office
Water Development Commission
WDEQ - Air Quality Division
WDEQ – Industrial Siting Division
WDEQ - Land Quality Division, Cheyenne
WDEQ - Land Quality Division, Sheridan
WDEQ - Water Quality Division

**Local Government and Agencies**

Big Horn County Commission, MT
Campbell County Board of Commissioners, WY
Campbell County Conservation District, WY
Campbell County Dept of Public Works, WY
Campbell County School District 1, WY
Carbon County, WY
City of Douglas, WY
City of Gillette, WY
Converse County Commission, WY
Converse County Joint Powers Board, WY
Converse County School District, WY
Converse City Special Projects, WY
Gillette Dept of Comm. Dev, WY
Rosebud County Commission, MT
Town of Wright, WY
Weston County Board of Comm., Newcastle, WY

Table 5-3. BLM Distribution List for the Wright Area Final EIS (Continued).

**Tribal Organizations and Individuals**

Apache Tribe of Oklahoma
Arapahoe Business Council
Cheyenne River Sioux Tribe
Cheyenne-Arapaho Tribes of Oklahoma
Comanche Nation
Crow Creek Sioux Tribe
Crow Tribe
Eastern Shoshone Tribe
Flandreau Santee Sioux Tribe
Kiowa Business Committee
Lower Brule Sioux Tribe
Northern Arapaho Business Council
Northern Arapaho Tribe
Northern Cheyenne Cultural Commission
Northern Cheyenne Tribe
Oglala Sioux Tribe
Rosebud Sioux Tribe
Santee Sioux Tribe
Shoshone Business Council
Standing Rock Sioux Tribe

**Other Organizations and Groups**

Advisory Council on Historic Preservation
Biodiversity Conservation Alliance
Campbell City Economic Dev. Corp.
CANDO
Center For Biological Diversity
Defenders of Wildlife
Federation for North American Wild Sheep
John P. Ellbogen Foundation
National Mining Association
National Wildlife Federation
Natural Resources Defense Council
Petroleum Association of Wyoming
Powder River Basin Resource Council
Sierra Club
Theodore Roosevelt Cons. Partnership
Thunder Basin Coalition
Trout Unlimited
WildEarth Guardians
WY Assoc. of Professional Archeologists
WY Business Council/NE Region
Wyoming Bankers Association
Wyoming Business Alliance
Wyoming Mining Association
Wyoming Outdoor Council
Wyoming Stock Growers Association
Wyoming Wildlife Federation
Wyoming Wool Growers Association

**Companies/Businesses**

ABN Amro Mortgage Group, Inc.
Aceite Energy Corp.
AE Investments, Inc.
AG Andrikopoulos Resources, Inc.
All American Equipment
Amax Land Co.
Amerada Hess Corp.
American Colloid Co.
Anadarko Exploration & Production
Anadarko Petroleum Corp.
Anderson Investments
Anderson Oil Company
Anderson Oil Ltd.
Antelope Coal Company
APC Operation Partnership, LP
Arch Western Resources, LLC
Ark Land Company
Bank of America, NA
Barret Resources Corp.
Beard Oil Co.
Belle Fourche Pipeline Co.
Berenergy Corp.
Bill Barrett CBM LLC
Bill Barrett Corp.
Bjork Lindley Little PC
BKS Environmental
BNSF Railway Co.
Boller-Mills Ranch
Bridgeview Coal Co.
Bridle Bit Ranch Co.
Buckskin Mine
Burlington Northern Santa Fe Railroad
Burns & McDonnell
C & H Oil & Gas, Inc.
Calvin Petroleum Corp.
Carbon Recovery Technology
Cargoil Oil and Gas LLC
CH Snyder Company
Chaco Energy Co.
Chaparral Royalty Co.
Chevron USA, Inc.
Citation 1994 Investment LP
Citation 2002 Investment LP
Cloud Peak Energy
Coleman Oil & Gas, Inc.
Colonial Royalties Limited Partnership
Conoco-Phillips Petroleum Company
CONSOL Inc Exploration & Land
Cordero Rojo Mine
Cosner Minerals Limited Partnership
Cowry Enterprises, Ltd.
CTV O & G Multi-State LLC
Cucker, Montgomery, Aronstein & Bess, PC
Dakota - TX Oil Company

Table 5-3. BLM Distribution List for the Wright Area Final EIS (Continued).

Daven Corp.
Davis Oil Co.
Derby Energy LLC
Devon Energy Production Company LLP
DL Cook Estate
DNR O & G Inc.
Dry Fork Coal Co.
Ducker Montgomery, et al.
Durham Ranches, Inc.
Dymond Resources Limited Partnership
EDE Consultants
El Paso Production Co.
Eland Energy, Inc.
Ellbogen Property Management LTD
Energy Operating Company, Inc.
ENSR
Environmental Solutions, Inc.
EOG Resources, Inc.
Explorers Petro Corp.
Exxon Mobil Oil Corp.
Fayette Oil & Gas Corp.
First Interstate Bank
First State Bank of Newcastle
Five Star Energy LLC
Fleischaker Mineral Co., LLC
Flocchini Investment
Flying J Oil & Gas, Inc.
Foundation Coal West, Inc.
Fulbright Tower, Guggenheim Corp.
Funding, LLC
Future Realty, Inc.
Geyer Brothers Equipment
GPM, Inc.
Great Points Energy
Greenbrair Energy LP IV
Guest Petroleum, Inc.
Hallador Petroleum, LLP
Hardin & Associates
Harvey E. Yates Co.
Headington Investments, Inc.
Headington Minerals, Inc.
HEYCO Employees LTD
Hilcorp Energy LLP
HQ-USAF/CEVP
Hunt Petroleum Inc.
Inexco Oil Co.
Intermountain Resources
Interwest Mining Co.
Isaacs Family Ltd Liability Ltd. Partnership
Jacobs Ranch Coal Co.
Jerry J. Dilts Family Ltd. Partnership
Jetta Production Co., Inc.
JIREH Exploration and Consulting, LLC
John E. Jacobs Family Company, LLC
Jolen Operating Co.
Journey Properties, LLC
JP Morgan Chase Bank, NA
JPC, LLC
KAB Acquisitions LLP-VI
Kaiser-Francis Oil Co.
Kastner Oil Properties, LLC
Kenneth R. Paulsen Consultants
Kerr McGee O & G Onshore LP
Kiewit Mining Group, Inc.
Kirby Minerals, LLC
Kirkwood Oil & Gas LLC
Klabzuba Oil & Gas Inc
KM Upstream, LLC
KN Gas Gathering, Inc.
Lasmo Oil & Gas, Inc.
LE Peabody & Associates
Liberty Petroleum Corp
Louisiana Land & Exploration Co.
M & K Oil Co., Inc.
Malibu Presbyterian Church
Manitowac Mortgage Holding Co.
Manx Oil Corp.
Marathon Oil Co.
Marshall & Winston, Inc.
Marston & Marston
McDun Limited Partnership
McGraw-Hill
McMoran Oil & Gas Co.
McVehil-Monnett Associates, Inc.
Meagher Oil & Gas Properties, Inc.
Medallion Exploration
Media Maconi
MEG Wyoming Gas Services, LLC
Meineadair Consultants
Merit Energy Co.
Merit Energy Partners
Mills Brothers
Mine Engineers, Inc.
Mining Associates of Wyoming
Moon Royalty, LLC
Morse Acquisition, LLC
Mourne Oil & Gas
Murjo Oil & Royalty Company
Nance Petroleum Corp.
National Leasing Corp.
Nationsbanc Leasing Corp
Nerco Coal Company
NM Doelger Consulting, LLC
Norwest Corporation
NPC, Inc.
Oilfield Salvage and Service Co.
Olive Oil LLC
Ostlund Investments
OXY USA, Inc.
P & M Coal Mining Co.
Pacific Power & Light Co.
Paribas North America

Table 5-3. BLM Distribution List for the Wright Area Final EIS (Continued).

Pathfinder Energy, Inc.
Patina Oklahoma Corp.
Peabody Coal Co.
Peabody Energy
Peabody Natural Gas LLC
Perry R. Bass, Inc.
Petro-Canada Resources (USA), Inc.
Petro-Hunt, LLC
Phillips Petroleum Co.
Phoenix Resources Co.
Plains Petroleum Operating Co.
Powder River Coal, LLC
Powder River Energy Corp.
Powder River Oil & Gas Ventures, LLC
Prima Oil & Gas Co.
Providence Energy Corporation
Quest Communications International, Inc.
Questar Exploration and Production Co.
QWEST
RAM Energy Inc.
Raymond T. Duncan Oil Properties LTD
Resolute Wyoming
RIM Offshore, Inc.
RL Zinn, et al, LTD
Robert M. Bass Group
Royalty Repository II, LLC
Ryder Stilwell Oil
Scorpio Resources, Inc.
Scot Holding Inc., dba Ture Blue Sky, Inc.
Shog Oil & Gas Co., LLC
Sid R. Bass, Inc.
Sioux Ranch, Inc.
Sonorin III, LLC
Spiral, Inc.
Sport Resources, Inc.
Star Investment Corp.
Steveco
Swift Energy Co.
TC Craighead & Co.
Teton Capital Management, Inc.
Tetra Tech EC, Inc.
The Bud & Mary Lou Flocchini Fam. Part.
Thru Line, Inc.
Thunder Basin Coal Co.
Thunder Creek Gas Services, LLC
Thunderbird-Jones & Stokes
Titan Resources Corp.
Tonka Oil & Gas Production, Inc.
TRC Environmental
Triton Coal Co., LLC
Tucker Family Investments, LLP
Two Rivers Ranch
Union Bank of California, NA
Union Pacific Railroad
US Bank National Association
US West Communications
Vintage Petroleum, Inc.
Wachovia Bank, National Association
Wells Fargo Bank, NA
Wellstar Corp.
West Roundup Resources, Inc.
Western Energy Company
Western Fuels Association
Western Gas Resources, Inc.
Westland Energy, Inc.
Whiting Petroleum Joint Venture 1983-84
Wilbanks Acquisitions I, LLC
Williams Field Service Co.
Williams Production RMT Co.
Wold Oil Properties, Inc.
WP Properties Corp.
WWC Engineering
Wyotex Oil Co.
Yates Petroleum Corp., et al.
Yates Petroleum Corp.
ZAB, Inc.
Zalman Resources, Inc.

**Press**

Associated Press
Casper Star Tribune
Douglas Budget
Gillette News-Record
Platts
Wyoming-Tribune Eagle

**Educational Institutions**

CSU Library
Northwestern University
NWU Policy Research Institute
University of Wyoming Libraries
URS Greiner Woodward Clyde Library
US Department of the Interior Library

**Individuals**

Awve, Carl
Awve, Delores
Aylsworth, Gayle
Baalman, Lynne M. & Mark I.
Barbero, Ralph
Bartolone, Carmen
Belden, Scott
Bennage, James

Table 5-3. BLM Distribution List for the Wright Area Final EIS (Continued).

Benson, Scott
Bierman, Sheldon
Birdsall, Jennie
Boller, Verne
Bradley Jr., Jack
Buchanan et vir, Patricia
Bunds, Carol
Burroughs, Chap
Chapa, Nancy
Chittenden, William M. & Lois R.
Collins, Kristina
Collums, James
Cottrell, Elizabeth Ann
Couch, Marion
Couch, Tom
Coulter, Betty
Craft, Lecia
Cupery, Karla
DeGroot, John
Deizell, Larry
Deputy et al., Robert
Dilts et ux, John
Diltz III, Fred
Ditmore, Judy
Dobbs, Kenna
Dorough Jr., Thomas
Dukam, Jennifer Springen
Dunlap, Katherin
Dymond, Michael
Edwards, Dorothy
Edwards, Linda
Edwards, Thomas W. & Leah B.
Fliginger, Mark
Flocchini Family, Richard & Patricia
Forbes Jr., Jim
Forster, Jamie
Fraley Jr., Thomas
Glover, Dewey and Ruth
Glustrom, Leslie
Graham, John
Greer, Virginia Lee
Greub, Twyla
Gryneberg, Celeste
Gunnison, Lila Mae
Hardy, Vern R.
Hays, James K.
Hays, Robert D.
Heisner, Bill
Hernandez, Beth
Hewit, Betty R.
Hines, Sandra
Holland, J. Read
Holt, David T.
Huckins, Coey
Huckins, Gary P.
Isenberger, Mathew Lee
Isenberger, Robert E.
Jester, Debra A.
Johnson-Head, Debra
Johnson-Hopson, DeMar
Joslyn, Jerald D.
Kennedy, George
Kimoski, Stephen
Kinnaman, Dorothy
Klabzuba, Robert
Klurfeld, Gregor
Kraning, James
Kruse, Douglas G.
Kruse, Gary
Leadbetter, Cheryl
Leadbetter, Linda
Lee, Vivian E.
Lenhert, Amy L.
Leutwyler, Scott
Levorsen, Sandra
Lieberman, Erin
Litton, Mr. & Mrs. Gene E.
Long, Robert L.
Masek, John
Matejec, Hazel E.
Maxey, Shirley E.
McAfee, Paul
McKee, Gwyn
McMahon Jr., Joe
Meadows, Kelly
Merritt, Linda J.
Merritt, Ruth A.
Migchelbrink, Margaret E.
Moore, Dr. Carl
Moore, Larry W.
Moore, Robert D.
Nash, Patsy Shubert
Nelson, Christine M.
Nichols, Jeremy
Nyenhuis, Jim
O'Connell, R.K.
Ogren, Harriet E.
Olson, Kermit G.
Papp, Alex
Paris, Jack W.
Pederson, Kathleen
Penner II, Robert L.
Penner, Wibert H.
Pippin, Robert L.
Powers, Shirley
Price et ux, William
Price, Bennett L.
Pridgeon, William & Elaine

Table 5-3. BLM Distribution List for the Wright Area Final EIS (Continued).

Priewe, Doran E.
Rock, Kim
Rockefeller, Mandra
Roderick, Jonathan S.
Roemer, Dr. Lamar B.
Rogers Jr., Richard J.
Rogers, Geri
Sauble, Dennis Mackey
Saulcy, Bill
Schmitt, Debbie S.
Schriner, Frances N.
Schwabauer et vir, Linda M.
Semple, William
Smith, Peter F.
Spangsberg, Shirley
Springen, Phyllis
Stadelman, Joseph & Diana
Stephens, Billie L.
Storey, Bill
Stringer, Luella M.
Stroock, Thomas F.
Stuart, Larry D.
Tanner, Sandy
Taylor, Janet C.
Terry, Evelyn M.
Terry, Mark W.
Turner, Dr. Jenny
Turner, Dr. Wendy
Turner, Dan
Turner, L.J.
Turner, Mike
Ukeiley, Robert
Unruh, Dean D.
Unruh, Florence E.
Van Dyke, Jeanne
Walker, Huntington
Wallin, Julia Springen
Wanger, Deena L.
Ward Linda
West, Jennie M.
Wilinson, John Allen
Wilkinson, Jerry & Rhonda
Williams, John
Williams, Keith
Williams, Monica
Wilmot, Roger R.
Wilmot, William W.
Winland, Mark
Wood, Derryl W.
Wright Davis, Mary Ellen & Bobby Gale
Wright, O. Dale
Young, Dennis D.

**Trusts**

Amy Lynn Lenhert Trust/Gerald T. Tresner Trust
Anna Louise Wright Carson, Trustee
Bennage Family Trust
Boller Trust
Burton Keith Reno, Jr., Trustee
Callies Family Trust
Carole J. Pahl Irrevocable Trust
Coramay Keeline Edelman Irrevocable Trust
David L. Herbaly Revocable Trust
Donald L. Anderson, Trustee
Doris I. Mills Living Trust
Earl & Mildred Boller Living Trust
Fleischman Revocable Trust
Frank Ford, Trustee
Gary P. Huckins, Trustee for Jeffery Thompson
George F. Collins, Jr. Trust
George R. & Elaine Keeline Trust
Guy W. Edwards Trust and Ruth A. Edwards
Harry W. Keeline II Trust
Hazel K. Nisselius Trust
Henderson Living Trust U/A/D
Irene Stuart Living Trust
Jack K. Nisselius, Revocable Trust
John & Shirley Long Revocable Trust
Joseph S. Pollare Living Trust
Keeline Oil & Gas Trust
Kenneth C. Revland Revocable Trust
Larry & Kathryn Dunlap Family Trust
Larry L. Jourgenson, Trustee
LaVern & Bill Stephens Revocable Trust
Maurita A. & Patrick M. Meehan, Trustees
Ms. Barbara H. Dilts Living Trust
Northern Trust Bank of Florida
Patsy Sue Shubert Trust
R. Reynared Mills Trust
R. Wesley Savage, Trustee
Reverend Burns Ind. & as Trustee
Robert L. Haynie Revocable Trust
Stuart Living Trust
TFS Trust
Thomas G. Dorough Trust Partnership
Willamas Family Trust (NE)
William E. Reno Revocable Trust
William L. Ferguson Trust
William R. & Dolores P. Wright II, Trustees
Willimas Family Trust (CA)
WL Ferguson Testamentary Trust
WTR Revocable Trust

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## 7.0 GLOSSARY

**aboriginal** - Related to early or primitive cultures in a region. Being the first or earliest known of its kind in a specific region.

**ad valorem tax** - A tax paid as a percentage of the assessed value of property.

**adverse impact** - An apparent direct or indirect detrimental effect.

**aliquot** - An exact portion.

**alkalinity** - The degree to which the pH of a substance is greater than 7.

**alluvial deposit** - Deposits of clay, silt, sand, gravel, and/or other materials carried by moving surface water, such as streams, and deposited at points of weak water flow; alluvium.

**alluvial valley floor (AVF)** - An area of unconsolidated stream-laid deposits holding streams with water availability sufficient for subirrigation or flood irrigation agricultural activities (see 30 CFR 701.5).

**alluvium** - Sorted or semi-sorted sediment consisting of clay, silt, sand, gravel, or other unconsolidated rock material deposited in comparatively recent geologic time by a stream or other body of running water in the bed of that stream or on its flood plain or delta.

**alternative** - In terms of the National Environmental Policy Act, one of several substitute or alternate proposals that a federal agency is considering in an environmental analysis.

**ambient** - Surrounding conditions (or environment) in a given place and time.

**ANFO** – An explosive blasting agent commonly used in open cut mining to aid in the removal of consolidated overburden, composed of ammonium nitrate and fuel oil.

**annual precipitation** - The quantity of water that falls yearly in the form of rain, hail, sleet, and snow.

**anthropogenic** - A direct result of human activities or are the result of natural processes that have been affected by human activities (IPCC/UNEP/OECD/IEA 1997).

**approximate original contour** - Post-mining surface configuration achieved by backfilling and grading of mined-out areas so that the reclaimed land surface resembles the general surface configuration of the land prior to mining (see 30 CFR 701.5).

**aquatic** - Living or growing in or on the water.

**aquifer** - A layer of permeable rock, sand, or gravel that stores and transmits water in sufficient quantities for a specific use. In hydrology, a rock layer or sequence that contains water and releases it in appreciable amounts. The rocks contain water-filled pores that, when connected, allow water to flow through their matrix. A confined aquifer is overlain by a rock layer that does not transmit water in any appreciable amount or that is impermeable. There probably are few truly confined aquifers. In an unconfined aquifer the upper surface (water table) is open to the atmosphere through permeable overlying material. An aquifer also may be called a water-bearing stratum, lens, or zone.

**aquitard** - A confining bed that retards but does not totally prevent the flow of water to or from an adjacent aquifer; a leaky confining bed.

**area source** – A plant site that does not emit any single HAP (Hazardous Air Pollutants) at a rate of 10 tons or greater per year, or any combination of HAPs at a rate of 25 tons or greater per year.

**ash** - The residual non-combustible matter in coal that comes from included silt, clay, silica, or other substances. The lower the ash content, the better the quality of the coal.

**avian** - Of, relating to, or derived from birds.

**backfill** - The operation of refilling an excavation. Also, the material placed in an excavation when it is refilled.

**baseline** - Conditions, including trends, existing in the human environment before a proposed action is begun; a benchmark state from which the environmental consequences of an action are forecast; the no-action alternative.

**beneficial impact** - An apparent direct or indirect advantageous effect.

**bentonite** – An absorptive and colloidal clay used especially as a sealing agent or suspending agent formed by the decomposition of volcanic ash which has the ability to absorb large amounts of water and to expand to several times its normal volume; used in adhesives, cements and ceramic fillers.

**biogenic** – Pertaining to a deposit resulting from the physiological activities of organisms.

**bonus** - That value in excess of the rentals and royalties that is paid to the United States as part of the consideration for receiving a lease for publicly owned minerals [see 43 CFR 3400.0-5(c)].

**buffer zone** - An area between two different land uses that is intended to resist, absorb, or otherwise preclude development or intrusion between the two use areas.

**bypass coal** - An isolated part of a coal deposit that is not leased and that can only be economically mined in an environmentally sound manner as a part of continued mining by an existing adjacent operation [see 43 CFR 3400.0.5(d)].

**carbon dioxide equivalent ($CO_2e$)** – Measures for describing how much global warming a given type and amount of greenhouse gas may cause, using the functionally equivalent amount or concentration of carbon dioxide as the reference. $CO_2e$ is expressed as parts per million by volume.

**carbon sink** - A natural or manmade reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period.

**cast blasting** – Commonly used in open cut mining to throw the overburden some distance in a controlled direction using a blasting agent (ANFO).

**climate change** - A change in long-term weather patterns, i.e. warmer or colder temperatures or an increase or decrease in annual amounts of rainfall or snowfall.

**clinker (scoria)** - Baked and fused rock resulting from in-place burning of coal deposits.

**coal bed natural gas (CBNG)** - Natural gas (methane) that is generated during the coal-forming process.

**colluvium** - Rock fragments, sand, or soil material that accumulates at the base of slopes; slope wash.

**confluence** - The point at which two or more streams meet.

**contiguous** - Lands or legal subdivisions having a common boundary, lands having only a common corner are not contiguous.

**cooperating agency** - An agency which has jurisdiction by law in an action being analyzed in an environmental document and who is requested to participate in the NEPA process by the agency that is responsible for preparing the environmental document [see 40 CFR 1501.6 and 1508.5].

**crucial wildlife habitat** - Parts of the habitat necessary to sustain a wildlife population during periods of their life cycle. It may be a limiting factor on the population, such as nesting habitat or winter habitat.

**cultural resources** - The remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins,

works of art, architecture, and natural features that reveal the nature of historic and prehistoric human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred, and (3) the environment immediately surrounding the resource.

**cumulative impact** - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

**decibel** - A unit of sound measurement. In general, a sound doubles in loudness for every increase of 10 decibels.

**deciview** - A general measure of view impairment (13 deciview equals a view of approximately 60 miles) caused by pollution. A 10 percent change in extinction corresponds to 1.0 dv.

**desorb** – To remove by the reverse of adsorption or absorption.

**dip** - The angle at which a rock layer is inclined from the horizontal.

**direct (or primary) impact** - An impact caused by an action that occurs at the same time and place as the action (see 40 CFR 1508.8).

**discharge** - Any of the ways that ground water comes out of the surface, including through springs, creeks, or being pumped from a well.

**dissected upland** - An upland or high area in which a large part of the original surface has been deeply cut into by surface water flow.

**dragline** - A type of excavating crane that casts a rope- or cable-hung bucket a considerable distance, collects the dug material by pulling the bucket toward itself on the ground with a second rope or cable, elevates the bucket, and dumps the material on a backfill bank or pile.

**eolian** – Deposits which are due to the transporting action of the wind.

**ephemeral stream** - A stream that flows occasionally because of surface runoff, and is not influenced by permanent ground water.

**erosion** - The wearing away of the land surface by running water, wind, ice or other geologic agents.

**evapotranspiration** - The sum total of water lost from the land by evaporation and plant transpiration.

**excavation (archeological)** - The scientifically controlled recovery of subsurface materials and information from a cultural site. Recovery techniques are relevant to research problems and are designed to produce maximum knowledge about the site's use, its relation to other sites and the natural environment, and its significance in the maintenance of the cultural system.

**fair market value** - The amount in cash, or in terms reasonably equivalent to cash, for which in all probability a coal deposit would be sold or leased by a knowledgeable owner willing but not obligated to sell or lease to a knowledgeable purchaser who desires but is not obligated to buy or lease.

**floodplain** - The relatively flat area or lowland adjoining a body of flowing water, such as a river or stream, that is covered with water when the river or stream overflows its banks.

**forage** - Vegetation used for food by wildlife, particularly big game wildlife, and domestic livestock.

**formation (geologic)** - A rock body distinguishable from other rock bodies and useful for mapping or description. Formations may be combined into groups or subdivided into members.

**fossil** - The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust. Many minerals that may be of biologic origin are not considered to be fossils (e.g. oil, gas, asphalt, limestone).

**geometric mean** - The $n^{th}$ root of the product of the values of n positive numbers.

**global warming** - An average increase in the Earth's temperature, which in turn causes changes in climate.

**greenhouse effect** - A theory that certain gases (so-called greenhouse gases) in the atmosphere impede the release of radiation from the earth, trapping heat in the atmosphere like glass over a greenhouse.

**groundwater** - Subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

**habitat** - A place where a plant or animal naturally or normally lives and grows.

**habituation** - The process of becoming accustomed to, or used to, something; acclimation.

**hazardous materials** - Substance which, because of its potential for corrosivity, toxicity, ignitability, chemical reactivity, or explosiveness, may cause injury to persons or damage to property.

**hazardous waste** - Those materials defined in Section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and listed in 40 CFR § 261. A used or discarded material that can damage the environment and be harmful to health. Hazardous wastes include heavy metals and toxic chemicals used in industrial products and processes as well as infectious medical wastes and radioactive materials such as spent nuclear fuel rods.

**heterogenous** - Made up of dissimilar constituents.

**human environment** - The natural and physical environment in which humans preside or have an impact and the relationship of people with the surrounding environment (see 30 CFR 1508.14).

**hydraulic conductivity** - The capacity of a medium to transmit water; permeability coefficient. Expressed as the volume of water at the prevailing temperature that will move in unit time under a unit hydraulic gradient through a unit area. Units include gallons per day per square foot, centimeters per second.

**hydraulic** - Pertaining to fluid in motion, or to movement or action caused by water.

**hydric soil** - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic (water-loving) vegetation. Hydric soils that occur in areas having positive indicators of hydrophytic vegetation and wetland hydrology are wetland soils.

**hydrocarbon** - Any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen.

**hydrology** - The science dealing with the behavior of water as it occurs in the atmosphere, on the surface of the ground, and underground.

**hydrophytic vegetation** - The plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. When hydrophytic vegetation comprises a community where indicators of hydric soils and wetland hydrology also occur, the area has wetland vegetation.

**impermeable** - Not capable of transmitting fluids or gasses in appreciable quantities.

**incised** - Having a margin that is deeply and sharply notched.

**indirect (or secondary) impact** - A reasonably foreseeable impact resulting from an action but occurring later in time than or removed in distance from that action (see 40 CFR 1508.8).

**in-place coal reserves** - The estimated volume of all of the coal reserves in a lease without considering economic or technological factors that might restrict mining.

**in-situ leach mining (ISL)** - Removal of the valuable components of a mineral deposit through chemical leaching without physical extraction of the rock. (ISL), also called **in-situ recovery** (ISR) or **solution mining**, is a process of recovering minerals such as copper and uranium through boreholes drilled into the deposit. The process initially involves drilling of holes into the ore deposit. Explosive or hydraulic fracturing may be used to create open pathways in the deposit for solution to penetrate. Leaching solution is pumped into the deposit where it makes contact with the ore. The solution bearing the dissolved ore content is then pumped to the surface and processed. This process allows the extraction of metals and salts from an ore body without the need for conventional mining involving drill-and-blast, open-cut or underground mining.

**interbedded** - Layers of one type of rock, typically thin, that are laid between or that alternate with layers of another type of rock.

**interburden** - A layer of sedimentary rock that separates two mineable coal beds.

**interdisciplinary** - Characterized by participation or cooperation among two or more disciplines or fields of study.

**intermittent stream** - A stream that does not flow year-round but has some association with ground water for surface or subsurface flow.

**laminated** - Consolidated or unconsolidated sediment that is characterized by thin (less than 1 cm thick) layers.

**land and resource management plan (LRMP)** - A land use plan that directs the use and allocation of U.S. Forest Service lands and resources.

**lead agency** - The agency or agencies preparing or having taken primary responsibility for preparing an environmental document (see 40 CFR 1508.16).

**lease (mineral)** - A legal document executed between a mineral owner or lessor and another party or lessee which grants the lessee the right to extract minerals from the tract of land for which the lease has been obtained [see 43 CFR 3400.0-5(r)].

**lek** - A traditional breeding area for grouse species where territorial males display and establish dominance.

**lenticular** - Term describing a body of rock or earth that thins out in all directions from the center like a double convex optical lens.

**limb (geologic)** - One side of a fold (syncline or anticline).

**limestone** - A sedimentary rock consisting chiefly of calcium carbonate.

**lineament** - A linear topographic feature of regional extent that is believed to reflect crustal structure.

**loadout facilities** - The mine facilities used to load the mined coal for transport out of the mine.

**loam** - A rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

**maintenance tract** - A federal coal tract that would continue or extend the life of an existing coal mine.

**major federal action** - An action with effects that may be major and which is potentially subject to federal control and responsibility (see 40 CFR 1508.18).

**major sources** – Those sources that emit more than 10 tons per year of any single hazardous air pollutant, or 25 tons of all hazardous air pollutants combined. The determination of major is based on all sources of hazardous air pollutants at the site, and not just the equipment affected by the MACT standard.

**maximum economic recovery** - The requirement that, based on standard industry operating practices, all profitable portions of a leased federal coal deposit must be mined. MER determinations will consider existing proven technology; commercially available and economically feasible equipment; coal quality, quantity, and marketability; safety, exploration, operating, processing, and transportation costs; and compliance with applicable laws and regulations [see 43 CFR 3480.0-5(a)(24)].

**meteorological** - Related to the science dealing with the atmosphere and its phenomena, especially as relating to weather.

**methane** - A colorless, odorless, and flammable gaseous hydrocarbon; the simplest hydrocarbon; chemical formula = $CH_4$. It is the product of decomposition of organic matter and of the carbonization of coal, is used as a fuel and as a starting material in chemical synthesis, and is the simplest of the alkanes, constituent of natural gas and is also found associated with crude oil and coal.

**mineable coal** - Coal that can be economically mined using present day mining technology.

**mineral rights** - The rights of one who owns the mineral estate (subsurface).

**mining permit** - A permit to conduct surface coal mining and reclamation operations issued by the state regulatory authority pursuant to a state program or by the Secretary pursuant to a federal program (see 30 CFR 701.5).

**mitigation** - An action to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

**mudstone** - A hardened sedimentary rock consisting of clay. It is similar to shale but lacks distinct layers.

**National Register of Historic Places (NRHP)** - A list of districts, sites, buildings, structures and objects significant in American history, architecture, archeology and culture maintained by the Secretary of the Interior. Expanded as authorized by Section 2(b) of the Historic Sites Act of 1935 (16 U.S.C. 462) and Section 101(a)(1) (A) of the National Historic Preservation Act.

**native species** – Native species refer to wild animals and plants that have evolved in a particular region and environment. Native species are the most adapted to the area and are more disease and drought resistant than non-native species. Native plants provide the greatest benefits to wildlife because the native wildlife evolved with native plants. Often the food provided by native plants is the most nutritious to our native wildlife.

**natural gas** - Combustible gases (such as hydrocarbons) or mixtures of combustible gases and non-combustible gases (such as helium) that are in a gaseous phase at atmospheric conditions of temperature and pressure.

**NEPA process** - All measures necessary for compliance with the National Environmental Policy Act of 1969 (see 40 CFR 1508.21).

**no action alternative** - An alternative where no activity would occur. The development of a no action alternative is required by regulations implementing the National Environmental Policy Act (40 CFR 1502.14). The No Action Alternative provides a baseline for estimating the effects of other alternatives.

**outcrop** - A rock formation that appears at or near the surface; the intersection of a rock formation with the surface.

**overburden** - Overburden is the term used in mining to describe material that lies above (excluding topsoil) the area of economic interest, *e.g.*, the rock and soil that lies above the coal seam. Also known as 'waste'. Overburden is distinct from tailings, the material that remains after economically valuable components have been extracted from the generally finely milled ore.

Overburden is removed during surface mining, but is typically not contaminated with toxic components and may be used to restore a mining site to a semblance of its appearance before mining began. Overburden may also be used as a term to describe all soil and ancillary material above the bedrock horizon in a given area.

**oxides of nitrogen ($NO_x$)** - The generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts.

**ozone** - A gas that is created by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight.

**paleontological resource** - A site containing evidence of plant or non-human animal life of past geological periods, usually in the form of fossil remains.

**peak discharge or flow** - The highest discharge of water recorded over a specified period of time at a given stream location; also called maximum flow. Often thought of in terms of spring snowmelt, summer, fall or winter rainy season flows.

**perennial species (vegetation)** - Vegetation that lives over from season to season.

**perennial stream** - A stream or part of a stream that flows continuously during the calendar year as a result of groundwater discharge or surface runoff.

**permeability** - The ability of rock or soil to transmit a fluid.

**permit application package** - A proposal to conduct surface coal mining and reclamation operations on federal lands, including an application for a permit, permit revision, or permit renewal and all the information required by SMCRA, the applicable state program, any applicable cooperative agreement, and all other applicable laws and regulations including, with respect to federal leased coal, the Mineral Leasing Act and its implementing regulations.

**permit area** - The area of land, indicated on the approved map submitted by the operator with his or her application, required to be covered by the operator's performance bond under the regulations at 30 CFR Part 800 and which shall include the area of land upon which the operator proposes to conduct surface coal mining and reclamation operations under the permit, including all disturbed areas (see 30 CFR 701.5).

**physiography** - Physical geography.

**playa** - The sandy, salty, or mud-caked flat floor of a basin with interior drainage, usually occupied by a shallow ephemeral lake during or after rain or snow storms.

**point source (pollution)** - A point at which pollution is added to a system, either instantaneously or continuously. An example is a smokestack.

**pore volume** - The amount of fluid necessary to fill the void space in an unsaturated porus medium (i.e., mine backfill).

**porosity** - The percentage of the bulk volume of rock, sediment or soil that is not occupied by sediment or soil particles; the void space in rock or sediment. It may be isolated or connected.

**postmining topography** - The relief and contour of the land that remains after mining has been completed.

**potentiometric surface** - The surface that coincides with the static level of water in an aquifer. The surface is represented by the levels to which water from a given aquifer will rise under its full hydraulic head.

**predator** - An animal that obtains food by killing and consuming other animals.

**prime or unique farmland** - Those lands which are defined by the Secretary of Agriculture in 7 CFR part 657 (*Federal Register* Vol. 4 No. 21) and which have historically been used for cropland (see 30 CFR 701.5).

**proposed action** - In terms of National Environmental Policy Act, the project, activity, or action that a federal agency proposes to implement or undertake and which is the subject of an environmental analysis.

**qualified surface owner** - The natural person or persons (or corporation, the majority stock of which is held by a person or persons otherwise meeting the requirements of this section) who:

(1) hold legal or equitable title to the surface of split estate lands;

(2) have their principal place of residence on the land, or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by surface mining operations; or received directly a significant portion of their income, if any, from such farming and ranching operations; and

(3) have met the conditions of (1) and (2) above for a period of at least three years, except for persons who gave written consent less than three years after they met the requirements of both (1) and (2) above [see 43 CFR 3400.0-5(gg)].

**raptor** - Bird of prey, such as an eagle, falcon, hawk, owl, or vulture.

**recharge** - The processes by which groundwater is absorbed into a zone of saturation.

**reclamation** - Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, revegetation (with native plant life) and other work necessary to restore the disturbed area for post-mining use. In general where viable an attempt to put the terrain back to the pre-mining contours is also of paramount importance.

**record of decision** - A document separate from, but associated with, an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action (see 40 CFR 1505.2).

**recoverable coal** - The amount of coal that (is economically feasible to recover) can actually be recovered for sale from the demonstrated coal reserve base.

**rental payment** - Annual payment from a lessee to a lessor to maintain the lessee's mineral lease rights.

**resource management plan** - A land use plan, as prescribed by FLPMA, that directs the use and allocation of public lands and resources managed by BLM. Prior to selection of the RMP, different alternative management plans are compared and evaluated in an environmental impact statement (EIS) to determine which plan will best direct the management of the public lands and resources.

**revegetation** - The reestablishment and development of self-sustaining plant cover following land disturbance. This may occur through natural processes, or the natural processes may be enhanced by human assistance through seedbed preparation, reseeding, and mulching.

**right of way** - The right to pass over property owned by another. The strip of land over which facilities such as roadways, railroads, or power lines are built.

**riparian** - The area adjacent to rivers and streams that lies between the stream channel and upland terrain and that supports specific vegetation influenced by perennial and/or intermittent water.

**royalty (mineral)** - A share of production that is free of the expense of production. It is generally paid by a lessee to a lessor of a mineral lease as part of the terms of the lease.

**runoff** - That portion of rainfall that is not absorbed; it may be used by vegetation, lost by evaporation, or it may find its way into streams as surface flow.

**salinity** - Refers to the solids, such as sodium chloride (table salt) and alkali metals, that are dissolved in water. Often in non-saltwater areas, total dissolved solids is used as an equivalent term.

**sandstone** - A common sedimentary rock primarily composed of sand grains, mainly quartz, that are cemented together by other mineral material.

**scoping** - A public informational process required by the National Environmental Policy Act to determine private and public concerns, scope of issues, and/or questions regarding a proposed action to be evaluated in an environmental impact analysis.

**scoria (clinker)** - Baked and fused rock resulting from in-place burning of coal deposits.

**sedimentation pond** - An impoundment used to remove solids from water in order to meet water quality standards or effluent limitations before the water leaves the permit area (see 30 CFR 701.5).

**semi-arid** - A climate or region characterized by little yearly rainfall and by the growth of a number of short grasses and shrubs.

**severance tax** - A tax on the removal of minerals from the ground.

**shale** - A very fine-grained clastic rock or sediment consisting predominately of clay-sized particles that is laminated; lithified, layered mud.

**significant impact** - A qualitative term used to describe the anticipated importance of impacts to the human and or the environment as a result of an action(s) either direct or indirect.

**siltstone** - A fine-grained clastic rock consisting predominately of silt-sized particles.

**socioeconomics** - The social and economic situation that might be affected by a proposed action.

**soil survey** - The systematic examination, description, classification, and mapping of soils in an area, usually a county. Soil surveys are classified according to the level of detail of field examination. Order I is the most detailed and Order V is the least detailed.

**spontaneous combustion** – The heating and slow combustion (self-ignition) of coal and coaly material initiated through chemical action (as oxidation (absorption of oxygen)).

**stipulations** - Requirements that are part of the terms of a mineral lease. Some stipulations are standard on all Federal leases. Other stipulations may be applied to specific leases at the discretion of the surface management agency to protect valuable surface resources or uses existing on those leases.

**storage coefficient** - The volume of water that can be released from storage per unit surface area of a saturated confined aquifer, per unit decline in the component of hydraulic head normal to the surface. It is calculated by taking the product of the specific storage and the aquifer thickness.

**stratigraphic** - Of, relating to, or determined by stratigraphy, which is the branch of geology dealing with the study of the nature, distribution, and relations of layered rocks in the earth's crust.

**stripping ratio** - The unit amount of overburden that must be removed to gain access to a similar unit amount of coal.

**subirrigation** - In alluvial valley floors, the supplying of water to plants from underneath, or from a semi-saturated or saturated subsurface zone where water is available for use by vegetation (see 30 CFR 701.5).

**subbituminous** - A lower rank of coal (35-45 percent carbon) with a heating value between that of bituminous and lignite, usually 8,300-11,500 Btu per pound. Sub bituminous coal contains a high percentage of volatile matter and moisture.

**surface disturbance** - Any disturbance by direct or indirect actions that alters the soil surface.

**surface rights** - Rights to the surface of the land, does not include rights to oil, gas, or other subsurface minerals or subsurface rights.

**suspended solids** - The very fine soil particles that remain in suspension in water for a considerable period of time without contact with the stream or river channel bottom.

**tectonic fracture** - Fractures caused by deformation of the earth's crust.

**threatened and endangered species** - These species of plants or animals classified as threatened or endangered pursuant to Section 4 of the Endangered Species Act. Any species which is in danger of extinction, or is likely to become so within the foreseeable future.

***Category 1*** - Substantial biological information on file to support the appropriateness of proposing to list as endangered or threatened.

***Category 2*** - Current information indicates that proposing to list as endangered or threatened is possibly appropriate, but substantial biological information is not on file to support an immediate ruling (U.S. Fish and Wildlife Service).

**topography** - Physical shape of the ground surface; the configuration of land surface including its relief, elevation, and the position of its natural and manmade features.

**topsoil** - The upper portion of a soil, usually dark colored and rich in organic material. It is more or less equivalent to the upper portion of an A horizon in an ABC soil.

**total dissolved solids (TDS)** - The total quantity in milligrams per liter of dissolved materials in water.

**transmissivity** - The rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient. Equals the hydraulic conductivity multiplied by the aquifer thickness. Values are given in units of gallons per day per foot.

**transpiration** - The discharge of water vapor by plants.

**truck & shovel** - A mining method used to remove overburden and coal in a strip mining operation. Truck and shovel operations use large bucket-equipped digging and loading machines (shovels) and large dump trucks to remove overburden instead of using a dragline for overburden removal.

**unconfined aquifer** - An aquifer where the water table is exposed to the atmosphere through openings in the overlying materials.

**unsuitability criteria** - The 20 criteria described in 43 CFR 3461, the application of which results in an assessment of federal coal lands as suitable or unsuitable for surface coal mining.

**upland** – Ground elevated above the lowlands located along drainage bottoms.

**uranium** - A very hard, heavy, metallic element that is crucial to development of atomic energy.

**vegetation type** - A kind of existing plant community with distinguishable characteristics described in terms of the present vegetation that dominates an area.

**vertebrate fossils** - The fossilized remains of animals that possessed a backbone; examples are fish, amphibians, reptiles, dinosaurs, birds, and mammals.

**vesicular** - Rock containing many small cavities that were formed by the expansion of a bubble of gas or steam during the solidification of the rock.

**visual resources** - The physical features of a landscape that can be seen (e.g., land, water, vegetation, structures, and other features).

**visual resource management** - Systematic means to identify visual values, establish objectives that provide the standards for managing those values, and evaluate visual impacts of proposed projects to ensure that objectives are met.

**volatile matter** - In coal, those substances, other than moisture, that are given off as gas or vapor during combustion.

**volatile organic compound** - Organic chemical compounds that have high enough vapor pressures under normal conditions to significantly vaporize and enter the atmosphere.

**waterfowl** - A bird that frequents water, especially a swimming bird such as a duck or swan.

**wetlands** - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include marshes, bogs, sloughs, potholes, river overflows, mud flats, wet meadows, seeps, and springs [see 33 CFR 328.3(a)(7)(b)].

**wild and scenic river** - Rivers or sections of rivers designated by Congressional actions under the 1968 Wild and Scenic Rivers Act as wild, scenic, or recreational by an act of the Legislature of the state or states through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

**wild river areas** - Rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

**scenic river areas** - Rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

**recreational river areas** - Rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

**wilderness** - An area of undeveloped Federal land designated wilderness by Congress, retaining its primeval character and influence, without permanent improvements or human habitation, protected and managed to preserve its natural conditions and that (1) generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable, (2) has outstanding opportunities for solitude or primitive and unconfined recreation, (3) has at least 5,000 acres or is of sufficient size to make practical its preservation and use in an unimpaired condition, and (4) also may contain features that are of ecological, geological, scientific, educational, scenic, or historical value. These characteristics were identified by Congress in the Wilderness Act of 1964.

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# APPENDIX A

## FEDERAL AND STATE PERMITTING REQUIREMENTS AND AGENCIES

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| APPENDIX A: FEDERAL AND STATE AGENCIES & PERMITTING REQUIREMENTS[1] | |
|---|---|
| **Agency** | **Lease/Permit/Action** |
| **FEDERAL** | |
| Bureau of Land Management | Coal Lease<br>Resource Recovery & Protection Plan<br>Scoria Sales Contract<br>Exploration Drilling Permit |
| Office of Surface Mining Reclamation and Enforcement | Preparation of MLA Mining Plan Approval Document<br>SMCRA Oversight |
| Office of the Secretary of the Interior | Approval of MLA Mining Plan |
| Mine Safety and Health Administration | Safety Permit and Legal ID<br>Ground Control Plan<br>Major Impoundments<br>Explosives Use and Storage Permit |
| Bureau of Alcohol, Tobacco, and Firearms | Explosives Manufacturer's License<br>Explosives Use and Storage Permit |
| Federal Communication Commission | Radio Permit: Ambulance<br>Mobile Relay System Radio License |
| Nuclear Regulatory Commission | Radioactive By-Products Material License |
| Army Corps of Engineers | Authorization of Impacts to Wetlands and Other Waters of the U.S. |
| Department of Transportation | Hazardous Waste Shipment Notification |
| Federal Aviation Administration | Radio Tower Facilities Construction Permits |
| **STATE** | |
| State Land Commission | Coal Lease<br>Scoria Lease |
| Department of Environmental Quality/Land Quality Division | Permit and License to Mine<br>Permit to Construct Sedimentation Pond |
| Department of Environmental Quality/Air Quality Division | Air Quality Permit to Operate<br>Air Quality Permit to Construct |
| Department of Environmental Quality/Water Quality Division | NPDES Water Discharge Permit<br>Authorization to Construct Septic Tank & Leach Field<br>Authorization to Construct and Install a Public Water Supply and Sewage Treatment System |
| Department of Environmental Quality/Solid Waste Management Program | Solid Waste Disposal Permit - Permanent and Construction |
| State Engineer's Office | Appropriation of Surface Water Permits<br>Appropriation of Ground Water Permits |
| Industrial Siting Council | Industrial Siting Certificate of Non-Jurisdiction |

[1] Individual Lease/Permit Actions listed may not be required at all mines.

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# APPENDIX B

## UNSUITABILITY CRITERIA FOR THE NORTH HIGHLIGHT FIELD, SOUTH HILIGHT FIELD, WEST HILIGHT FIELD, WEST JACOBS RANCH, NORTH PORCUPINE, AND SOUTH PORCUPINE LBA STUDY AREAS

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# APPENDIX B. UNSUITABILITY CRITERIA FOR THE NORTH HIGHLIGHT FIELD LBA STUDY AREA

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE NORTH HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 1. **Federal Land Systems.** With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for mining: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers, National Recreation Areas, Lands acquired through the Land and Water Conservation Fund, National Forests and Federal lands in incorporated cities, towns and villages. | There are Federal lands located around Gillette, Sheridan, and Wright that were determined to be unsuitable under this criterion. TBNG lands are included in the North Hilight Field LBA study area. The TBNG is not a proclaimed National Forest. | None of the federal lands determined to be unsuitable under Criterion 1 are present on the North Hilight Field LBA study area. Therefore, there are no unsuitable findings under this criterion. |
| 2. **Rights-Of-Way and Easements.** Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial or other public purposes, on federally owned surface, are unsuitable for mining. | Portions of the BNSF & UP railroad ROW, the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW were found to be unsuitable under this criterion within the general review area. | The portions of the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, the I-90 ROW, and the BNSF & UP railroad ROW that were determined to be unsuitable are not located on the North Hilight Field LBA study area. Therefore, there area no unsuitable findings under Criterion 2 for the North Hilight Field LBA study area. |
| 3. **Buffer Zones for Rights-Of-Way, Communities, and Buildings.** Federal lands within 100 ft of a ROW of a public road or a cemetery; or within 300 ft of any public building, school, church, community or institutional building or public park; or within 300 ft of an occupied dwelling are unsuitable for mining. | Portions of Wyoming State Highway 450, Interstate Highway I-90, and one cemetery were found to be unsuitable under this criterion. Decisions were deferred on other highways/roads, occupied dwellings, and one school until an application to lease is filed. | Highway 450, I-90, and the cemetery are not located on the North Hilight Field LBA study area. No occupied dwellings or schools are located on the study area. Portions of the ROWs of the Shroyer, Hilight, Small, and Jacobs roads, all county roads, are located on the tract as applied for and/or under Alternative 2. The Small and Jacobs roads have been vacated by the Campbell County Commissioners. Therefore, the portions of the North Hilight Field LBA study area within the ROWs of the Shroyer and Hilight roads and the associated 100-ft buffer zones are designated unsuitable and the lease will be stipulated to exclude mining within these areas unless a permit to move the road is approved by Campbell County Board of Commissioners. |
| 4. **Wilderness Study Areas.** Federal lands designated as wilderness study areas are unsuitable for mining while under review for possible wilderness designation. | No lands in the general review area are within a wilderness study area. | There are no unsuitable findings under Criterion 4 for the North Hilight Field LBA study area. |
| 5. **Scenic Areas.** Scenic federal lands designated by visual resource management analysis as Class I (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable. | No lands in the general review area meet the scenic criteria as outlined. | There are no unsuitable findings under Criterion 5 for the North Hilight Field LBA study area. |
| 6. **Land Used for Scientific Study.** Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study. | Two vegetation monitoring study sites on the TBNG (NE¼ of Sec. 1, T.41N., R.71W. and NW¼ NW¼ of Sec. 30, T.41N., R.69W.), and the Hoe Creek Site (Sec. 7, T.47N., R.72W.) were found to be unsuitable under this criterion. | The vegetation monitoring sites and the Hoe Creek site are not located on the North Hilight Field LBA study area. There are no unsuitable findings under Criterion 6 for the North Hilight Field LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE NORTH HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 7. **Cultural Resources.** All publicly or privately owned places which are included in or are eligible for inclusion in the NRHP and an appropriate buffer zone are unsuitable. | On the basis of the consultation with SHPO, there were no unsuitable findings under this criterion in the general review area. Continue using the "Standard Archeological Stipulation" to new leases. | There are no unsuitable findings under Criterion 7 for the North Hilight Field LBA study area. The "Standard Archeological Stipulation" should be applied if this tract is leased. |
| 8. **Natural Areas.** Federal lands designated as natural areas or National Natural Landmarks are unsuitable. | No lands in the general review area are designated as natural areas or as National Natural Landmarks. | There are no unsuitable findings under Criterion 8 for the North Hilight Field LBA study area. |
| 9. **Critical Habitat for Threatened or Endangered Plant and Animal Species.** Federally designated critical habitat for threatened or endangered plant and animal species, and scientifically documented essential habitat for threatened or endangered species are unsuitable. | There is no federally designated critical habitat for threatened or endangered plant or animal species within the general review area. | There are no unsuitable findings under Criterion 9 for the North Hilight Field LBA study area. |
| 10. **State Listed Threatened or Endangered Species.** Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as threatened or endangered shall be considered unsuitable. | Wyoming does not maintain a state list of threatened or endangered species of plants or animals. Therefore, this criterion does not apply. | There are no unsuitable findings under Criterion 10 for the North Hilight Field LBA study area. |
| 11. **Bald or Golden Eagle Nests.** An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved. | Defer suitability decisions and evaluate bald and golden eagle nests on a case by case basis at the time of leasing. Establish buffer zones around nests during mining and reclamation planning after consultation with USFWS. | There are currently no bald or golden eagle nests (active or inactive) on the North Hilight Field LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 12. **Bald and Golden Eagle Roost and Concentration Areas.** Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed. | Defer suitability decisions and evaluate bald and golden eagle roost areas on a case by case basis prior to lease issuance. Establish buffer zones after consultation with USFWS. | There are no identified roost sites on the North Hilight Field LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 13. **Falcon Nesting Sites and Buffer Zones.** Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected. | Defer suitability decisions on falcon nesting sites and evaluate on a case by case basis prior to lease issuance. Establish buffer zones around nesting sites after consultation with USFWS. | No falcon nesting sites have been identified on the North Hilight Field LBA study area. There are no unsuitable findings under Criterion 13 for the North Hilight Field LBA study area. |
| 14. **Habitat for Migratory Bird Species.** Federal lands which are high priority habitat for migratory bird species of management concern in Wyoming shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use. | Defer suitability decisions on high priority habitat for migratory bird species of management concern in Wyoming and evaluate on a case by case basis prior to lease issuance. Establish buffer zones for nesting areas during mining and reclamation planning after consultation with USFWS. | Evaluate suitability during consultation with USFWS. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE NORTH HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 15. **Fish and Wildlife Habitat for Resident Species.** Federal lands which the surface management agency and state jointly agree are fish, wildlife and plant habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable unless mining can be conducted in such a way as to ensure no long-term impact on the species being provided will occur. | Defer suitability decisions on grouse leks and evaluate on a case by case basis prior to lease issuance. Establish buffer zones after consultation with WGFD. | There is currently one occupied and one unoccupied/abandoned (no activity for 10 consecutive years) sage-grouse lek identified on lands within the North Hilight Field LBA study area. There are currently no other occupied or unoccupied sage-grouse leks within 2 miles of the North Hilight Field LBA study area. Evaluate this criterion prior to lease issuance. Establish buffer zones during mining and reclamation planning after consultation with WGFD. |
| 16. **Floodplains.** Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable where it is determined that mining could not be undertaken without substantial threat of loss of life or property. | The BLM and USFS have determined that the identified floodplains in the general review area could potentially be mined. Therefore, all lands within the general review area are considered suitable. | Site-specific stipulations and resource protection safeguards will be applied if necessary during mining and reclamation planning. There are no unsuitable findings under Criterion 16 for the North Hilight Field LBA study area. |
| 17. **Municipal Watersheds.** Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable. | There are no designated municipal watersheds in the general review area. | There are no unsuitable findings under Criterion 17 for the North Hilight Field LBA study area |
| 18. **National Resource Waters.** Federal lands with national resource waters, as identified by states in their water quality management plans, and ¼-mile buffer zones shall be unsuitable. | There are no designated national resource waters within the general review area. | There are no unsuitable findings under Criterion 18 for the North Hilight Field LBA study area. |
| 19. **Alluvial Valley Floors.** Federal lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable. | Consider areas determined to contain AVFs significant to farming as unsuitable. Defer decisions on other AVFs and analyze on a case-by-case basis prior to lease issuance. | No AVFs or potential AVFs have been identified on the North Hilight Field LBA study area with characteristics indicating potential significance to farming. There are no unsuitable findings under Criterion 19 for the North Hilight Field LBA study area. |
| 20. **State or Indian Tribe Criteria.** Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable. | There are no criterion proposed by state or Indian tribes that have been approved by the Secretary of the Interior. No tribal lands are located in or near the general review area. | There are no unsuitability findings for this criterion on the North Hilight Field LBA study area. |

# APPENDIX B. UNSUITABILITY CRITERIA FOR THE SOUTH HIGHLIGHT FIELD LBA STUDY AREA

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE SOUTH HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 1. **Federal Land Systems.** With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for mining: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers, National Recreation Areas, Lands acquired through the Land and Water Conservation Fund, National Forests and Federal lands in incorporated cities, towns and villages. | There are Federal lands located around Gillette, Sheridan, and Wright that were determined to be unsuitable under this criterion. TBNG lands are included in the South Hilight Field LBA study area. The TBNG is not a proclaimed National Forest. | None of the federal lands determined to be unsuitable under Criterion 1 are present on the South Hilight Field LBA study area. Therefore, there are no unsuitable findings under this criterion. |
| 2. **Rights-Of-Way and Easements.** Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial or other public purposes, on federally owned surface, are unsuitable for mining. | Portions of the BNSF & UP railroad ROW, the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW were found to be unsuitable under this criterion within the general review area. | The portions of the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW that were determined to be unsuitable are not located on the South Hilight Field LBA study area. A portion of the north-south BNSF & UP railroad ROW that was found to be unsuitable for mining is located on the western boundary of tract as applied for and under Alternative 2. Therefore, this portion of the BNSF & UP railroad ROW was designated unsuitable and the lease will be stipulated to exclude mining within the ROW. |
| 3. **Buffer Zones for Rights-Of-Way, Communities, and Buildings.** Federal lands within 100 ft of a ROW of a public road or a cemetery; or within 300 ft of any public building, school, church, community or institutional building or public park; or within 300 ft of an occupied dwelling are unsuitable for mining. | Portions of Wyoming State Highway 450, Interstate Highway I-90, and one cemetery were found to be unsuitable under this criterion. Decisions were deferred on other highways/roads, occupied dwellings, and one school until an application to lease is filed. | Highway 450, I-90, and the cemetery are not located on the South Hilight Field LBA study area. No occupied dwellings or schools are located on the study area. Portions of the ROWs of the Hilight and Reno roads, both county roads, are located on the tract as applied for and/or under Alternative 2. Therefore, the portions of the South Hilight Field LBA study area within the ROWs of the Hilight and Reno roads and the associated 100-ft buffer zones are designated unsuitable and the lease will be stipulated to exclude mining within these areas unless a permit to move the road is approved by Campbell County Board of Commissioners. |
| 4. **Wilderness Study Areas.** Federal lands designated as wilderness study areas are unsuitable for mining while under review for possible wilderness designation. | No lands in the general review area are within a wilderness study area. | There are no unsuitable findings under Criterion 4 for the South Hilight Field LBA study area. |
| 5. **Scenic Areas.** Scenic federal lands designated by visual resource management analysis as Class I (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable. | No lands in the general review area meet the scenic criteria as outlined. | There are no unsuitable findings under Criterion 5 for the South Hilight Field LBA study area. |
| 6. **Land Used for Scientific Study.** Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study. | Two vegetation monitoring study sites on the TBNG (NE¼ of Sec. 1, T.41N., R.71W. and NW¼ NW¼ of Sec. 30, T.41N., R.69W.), and the Hoe Creek Site (Sec. 7, T.47N., R.72W.) were found to be unsuitable under this criterion. | The vegetation monitoring sites and the Hoe Creek site are not located on the South Hilight Field LBA study area. There are no unsuitable findings under Criterion 6 for the South Hilight Field LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR SOUTH HILIGHT FIELD LBA STUDY AREA |
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| 7. **Cultural Resources.** All publicly or privately owned places which are included in or are eligible for inclusion in the NRHP and an appropriate buffer zone are unsuitable. | On the basis of the consultation with SHPO, there were no unsuitable findings under this criterion in the general review area. Continue using the "Standard Archeological Stipulation" to new leases. | There are no unsuitable findings under Criterion 7 for the South Hilight Field LBA study area. The "Standard Archeological Stipulation" should be applied if this tract is leased. |
| 8. **Natural Areas.** Federal lands designated as natural areas or National Natural Landmarks are unsuitable. | No lands in the general review area are designated as natural areas or as National Natural Landmarks. | There are no unsuitable findings under Criterion 8 for the South Hilight Field LBA study area. |
| 9. **Critical Habitat for Threatened or Endangered Plant and Animal Species.** Federally designated critical habitat for threatened or endangered plant and animal species, and scientifically documented essential habitat for threatened or endangered species are unsuitable. | There is no federally designated critical habitat for threatened or endangered plant or animal species within the general review area. | There are no unsuitable findings under Criterion 9 for the South Hilight Field LBA study area. |
| 10. **State Listed Threatened or Endangered Species.** Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as threatened or endangered shall be considered unsuitable. | Wyoming does not maintain a state list of threatened or endangered species of plants or animals. Therefore, this criterion does not apply. | There are no unsuitable findings under Criterion 10 for the South Hilight Field LBA study area. |
| 11. **Bald or Golden Eagle Nests.** An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved. | Defer suitability decisions and evaluate bald and golden eagle nests on a case by case basis at the time of leasing. Establish buffer zones around nests during mining and reclamation planning after consultation with USFWS. | There are currently no bald or golden eagle nests (active or inactive) on the South Hilight Field LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 12. **Bald and Golden Eagle Roost and Concentration Areas.** Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed. | Defer suitability decisions and evaluate bald and golden eagle roost areas on a case by case basis prior to lease issuance. Establish buffer zones after consultation with USFWS. | There are no identified roost sites on the South Hilight Field LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 13. **Falcon Nesting Sites and Buffer Zones.** Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected. | Defer suitability decisions on falcon nesting sites and evaluate on a case by case basis prior to lease issuance. Establish buffer zones around nesting sites after consultation with USFWS. | No falcon nesting sites have been identified on the South Hilight Field LBA study area. There are no unsuitable findings under Criterion 13 for the South Hilight Field LBA study area. |
| 14. **Habitat for Migratory Bird Species.** Federal lands which are high priority habitat for migratory bird species of management concern in Wyoming shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use. | Defer suitability decisions on high priority habitat for migratory bird species of management concern in Wyoming and evaluate on a case by case basis prior to lease issuance. Establish buffer zones for nesting areas during mining and reclamation planning after consultation with USFWS. | Evaluate suitability during consultation with USFWS. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR SOUTH HILIGHT FIELD STUDY AREA |
|---|---|---|
| **15. Fish and Wildlife Habitat for Resident Species.** Federal lands which the surface management agency and state jointly agree are fish, wildlife and plant habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable unless mining can be conducted in such a way as to ensure no long-term impact on the species being provided will occur. | Defer suitability decisions on grouse leks and evaluate on a case by case basis prior to lease issuance. Establish buffer zones after consultation with WGFD. | There are currently are no occupied (active within the last 10 years) or unoccupied (destroyed or abandoned) sage-grouse leks indentified on lands within the South Hilight Field LBA study area. There is currently one unoccupied (destroyed) sage-grouse lek located on an existing Black Thunder Mine lease within 2 miles of the South Hilight Field LBA study area. Evaluate this criterion prior to lease issuance. Establish buffer zones during mining and reclamation planning after consultation with WGFD. |
| **16. Floodplains.** Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable where it is determined that mining could not be undertaken without substantial threat of loss of life or property. | The BLM and USFS have determined that the identified floodplains in the general review area could potentially be mined. Therefore, all lands within the general review area are considered suitable. | Site-specific stipulations and resource protection safeguards will be applied if necessary during mining and reclamation planning. There are no unsuitable findings under Criterion 16 for the South Hilight Field LBA study area. |
| **17. Municipal Watersheds.** Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable. | There are no designated municipal watersheds in the general review area. | There are no unsuitable findings under Criterion 17 for the South Hilight Field LBA study area. |
| **18. National Resource Waters.** Federal lands with national resource waters, as identified by states in their water quality management plans, and ¼-mile buffer zones shall be unsuitable. | There are no designated national resource waters within the general review area. | There are no unsuitable findings under Criterion 18 for the South Hilight Field LBA study area. |
| **19. Alluvial Valley Floors.** Federal lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable. | Consider areas determined to contain AVFs significant to farming as unsuitable. Defer decisions on other AVFs and analyze on a case-by-case basis prior to lease issuance. | No AVFs or potential AVFs have been identified on the South Hilight Field LBA study area with characteristics indicating potential significance to farming. There are no unsuitable findings under Criterion 19 for the South Hilight Field LBA study area. |
| **20. State or Indian Tribe Criteria.** Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable. | There are no criterion proposed by state or Indian tribes that have been approved by the Secretary of the Interior. No tribal lands are located in or near the general review area. | There are no unsuitability findings for this criterion on the South Hilight Field LBA study area. |

# APPENDIX B. UNSUITABILITY CRITERIA FOR THE WEST HILIGHT FIELD LBA STUDY AREA

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR WEST HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 1. **Federal Land Systems.** With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for mining: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers, National Recreation Areas, Lands acquired through the Land and Water Conservation Fund, National Forests and Federal lands in incorporated cities, towns and villages. | There are Federal lands located around Gillette, Sheridan, and Wright that were determined to be unsuitable under this criterion. TBNG lands are included in the West Hilight Field LBA study area. The TBNG is not a proclaimed National Forest. | None of the federal lands determined to be unsuitable under Criterion 1 are present on the West Hilight Field LBA study area. Therefore, there are no unsuitable findings under this criterion. |
| 2. **Rights-Of-Way and Easements.** Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial or other public purposes, on federally owned surface, are unsuitable for mining. | Portions of the BNSF & UP railroad ROWs, the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW were found to be unsuitable under this criterion within the general review area. | The portions of the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW that were determined to be unsuitable are not located on the West Hilight Field LBA study area. A portion of the north-south BNSF & UP railroad ROW that was found to be unsuitable for mining is located on the eastern boundary of the tract configured under Alternative 2. Therefore, this portion of the BNSF & UP railroad ROW was designated unsuitable and the lease will be stipulated to exclude mining within the ROW. |
| 3. **Buffer Zones for Rights-Of-Way, Communities, and Buildings.** Federal lands within 100 ft of a ROW of a public road or a cemetery; or within 300 ft of any public building, school, church, community or institutional building or public park; or within 300 ft of an occupied dwelling are unsuitable for mining. | Portions of Wyoming State Highway 450, Interstate Highway I-90, and one cemetery were found to be unsuitable under this criterion. Decisions were deferred on other highways/roads, occupied dwellings, and one school until an application to lease is filed. | I-90 and the cemetery are not located on the West Hilight Field LBA study area. No occupied dwellings or schools are located on the study area. The West Hilight Field LBA study area includes a portion of Highway 450 west of the intersection with the north-south main BNSF & UP railroad trunk line, which was not designated unsuitable for mining under Criterion 2. However, a portion of the Highway 450 ROW is located on the tract as applied for and under Alternatives 2 and 3. A portion of the ROW of the Hilight Road, a county road, is also located on the tract configured under Alternatives 2 and 3. Therefore, the portions of the West Hilight Field LBA study area within the ROWs of Highway 450 and Hilight Road and the associated 100-ft buffer zones are designated unsuitable and the lease will be stipulated to exclude mining within these areas unless permits to move the highway and road are approved by Wyoming Department of Transportation and Campbell County Commissioners, respectively. |
| 4. **Wilderness Study Areas.** Federal lands designated as wilderness study areas are unsuitable for mining while under review for possible wilderness designation. | No lands in the general review area are within a wilderness study area. | There are no unsuitable findings under Criterion 4 for the West Hilight Field LBA study area. |
| 5. **Scenic Areas.** Scenic federal lands designated by visual resource management analysis as Class 1 (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable. | No lands in the general review area meet the scenic criteria as outlined. | There are no unsuitable findings under Criterion 5 for the West Hilight Field LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR WEST HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 6. **Land Used for Scientific Study.** Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study. | Two vegetation monitoring study sites on the TBNG (NE¼ of Sec. 1, T.41N., R.71W. and NW¼ NW¼ of Sec. 30, T.41N., R.69W.), and the Hoe Creek Site (Sec. 7, T.47N., R.72W.) were found to be unsuitable under this criterion. | The vegetation monitoring sites and the Hoe Creek site are not located on the West Hilight Field LBA study area. There are no unsuitable findings under Criterion 6 for the West Hilight Field LBA study area. |
| 7. **Cultural Resources.** All publicly or privately owned places which are included in or are eligible for inclusion in the NRHP and an appropriate buffer zone are unsuitable. | On the basis of the consultation with SHPO, there were no unsuitable findings under this criterion in the general review area. Continue using the "Standard Archeological Stipulation" to new leases. | There are no unsuitable findings under Criterion 7 for the West Hilight Field LBA study area. The "Standard Archeological Stipulation" should be applied if this tract is leased. |
| 8. **Natural Areas.** Federal lands designated as natural areas or National Natural Landmarks are unsuitable. | No lands in the general review area are designated as natural areas or as National Natural Landmarks. | There are no unsuitable findings under Criterion 8 for the West Hilight Field LBA study area. |
| 9. **Critical Habitat for Threatened or Endangered Plant and Animal Species.** Federally designated critical habitat for threatened or endangered plant and animal species, and scientifically documented essential habitat for threatened or endangered species are unsuitable. | There is no federally designated critical habitat for threatened or endangered plant or animal species within the general review area. | There are no unsuitable findings under Criterion 9 for the West Hilight Field LBA study area. |
| 10. **State Listed Threatened or Endangered Species.** Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as threatened or endangered shall be considered unsuitable. | Wyoming does not maintain a state list of threatened or endangered species of plants or animals. Therefore, this criterion does not apply. | There are no unsuitable findings under Criterion 10 for the West Hilight Field LBA study area. |
| 11. **Bald or Golden Eagle Nests.** An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved. | Defer suitability decisions and evaluate bald and golden eagle nests on a case by case basis at the time of leasing. Establish buffer zones around nests during mining and reclamation planning after consultation with USFWS. | There are currently no bald eagle nests (active or inactive) on the West Hilight Field LBA study area. There is currently one active golden eagle nest within ¼ mile of the West Hilight Field LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 12. **Bald and Golden Eagle Roost and Concentration Areas.** Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed. | Defer suitability decisions and evaluate bald and golden eagle roost areas on a case by case basis prior to lease issuance. Establish buffer zones after consultation with USFWS. | There are no identified roost sites on the West Hilight Field LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 13. **Falcon Nesting Sites and Buffer Zones.** Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected. | Defer suitability decisions on falcon nesting sites and evaluate on a case by case basis prior to lease issuance. Establish buffer zones around nesting sites after consultation with USFWS. | No falcon nesting sites have been identified on the West Hilight Field LBA study area. There are no unsuitable findings under Criterion 13 for the West Hilight Field LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR WEST HILIGHT FIELD LBA STUDY AREA |
|---|---|---|
| 14. **Habitat for Migratory Bird Species.** Federal lands which are high priority habitat for migratory bird species of management concern in Wyoming shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use. | Defer suitability decisions on high priority habitat for migratory bird species of management concern in Wyoming and evaluate on a case by case basis prior to lease issuance. Establish buffer zones for nesting areas during mining and reclamation planning after consultation with USFWS. | Evaluate suitability during consultation with USFWS. |
| 15. **Fish and Wildlife Habitat for Resident Species.** Federal lands which the surface management agency and state jointly agree are fish, wildlife and plant habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable unless mining can be conducted in such a way as to ensure no long-term impact on the species being provided will occur. | Defer suitability decisions on grouse leks and evaluate on a case by case basis prior to lease issuance. Establish buffer zones after consultation with WGFD. | There is currently one undetermined (no documented activity for the last 10 years, but insufficient information to designate occupied) sage-grouse lek identified on lands within the West Hilight Field LBA study area, and one undetermined sage-grouse lek located within 2 miles of the West Hilight Field LBA study area. Evaluate this criterion prior to lease issuance. Establish buffer zones during mining and reclamation planning after consultation with WGFD. |
| 16. **Floodplains.** Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable where it is determined that mining could not be undertaken without substantial threat of loss of life or property. | The BLM and USFS have determined that the identified floodplains in the general review area could potentially be mined. Therefore, all lands within the general review area are considered suitable. | Site-specific stipulations and resource protection safeguards will be applied if necessary during mining and reclamation planning. There are no unsuitable findings under Criterion 16 for the West Hilight Field LBA study area. |
| 17. **Municipal Watersheds.** Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable. | There are no designated municipal watersheds in the general review area. | There are no unsuitable findings under Criterion 17 for the West Hilight Field LBA study area. |
| 18. **National Resource Waters.** Federal lands with national resource waters, as identified by states in their water quality management plans, and ¼-mile buffer zones shall be unsuitable. | There are no designated national resource waters within the general review area. | There are no unsuitable findings under Criterion 18 for the West Hilight Field LBA study area. |
| 19. **Alluvial Valley Floors.** Federal lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable. | Consider areas determined to contain AVFs significant to farming as unsuitable. Defer decisions on other AVFs and analyze on a case-by-case basis prior to lease issuance. | No AVFs or potential AVFs have been identified on the West Hilight Field LBA study area with characteristics indicating potential significance to farming. There are no unsuitable findings under Criterion 19 for the West Hilight Field LBA study area. |
| 20. **State or Indian Tribe Criteria.** Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable. | There are no criterion proposed by state or Indian tribes that have been approved by the Secretary of the Interior. No tribal lands are located in or near the general review area. | There are no unsuitability findings for this criterion on the West Hilight Field LBA study area. |

# APPENDIX B. UNSUITABILITY CRITERIA FOR THE WEST JACOBS RANCH LBA STUDY AREA

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE WEST JACOBS RANCH LBA STUDY AREA |
|---|---|---|
| 1. **Federal Land Systems.** With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for mining: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers, National Recreation Areas, Lands acquired through the Land and Water Conservation Fund, National Forests and Federal lands in incorporated cities, towns and villages. | There are Federal lands located around Gillette, Sheridan, and Wright that were determined to be unsuitable under this criterion. No TBNG lands are included in the West Jacobs Ranch LBA study area. The TBNG is not a proclaimed National Forest. | None of the federal lands determined to be unsuitable under Criterion 1 are present on the West Jacobs Ranch LBA study area. Therefore, there are no unsuitable findings under this criterion. |
| 2. **Rights-Of-Way and Easements.** Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial or other public purposes, on federally owned surface, are unsuitable for mining. | Portions of the BNSF & UP railroad ROWs, the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW were found to be unsuitable under this criterion within the general review area. | The portions of the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW that were determined to be unsuitable are not located on the West Jacobs Ranch LBA study area. A portion of the north-south BNSF & UP railroad ROW that was found to be unsuitable for mining is located on the eastern boundary of the tract as applied for and under Alternative 2. Therefore, this portion of the BNSF & UP railroad ROW was designated unsuitable and the lease will be stipulated to exclude mining within the ROW. |
| 3. **Buffer Zones for Rights-Of-Way, Communities, and Buildings.** Federal lands within 100 ft of a ROW of a public road or a cemetery; or within 300 ft of any public building, school, church, community or institutional building or public park; or within 300 ft of an occupied dwelling are unsuitable for mining. | Portions of Wyoming State Highway 450, Interstate Highway I-90, and one cemetery were found to be unsuitable under this criterion. Decisions were deferred on other highways/roads, occupied dwellings, and one school until an application to lease is filed. | I-90 and the cemetery are not located on the West Jacobs Ranch LBA study area. No occupied dwellings or schools are located on the study area. The West Jacobs Ranch LBA study area includes a portion of Highway 450 west of the intersection with the north-south main BNSF & UP railroad trunk line, which was not designated unsuitable for mining under Criterion 2. However, a portion of the Highway 450 ROW is located on the tract as applied for and under Alternative 2. A portion of the ROW of the Hilight Road, a county road, is also located on the tract as applied for and under Alternative 2. Therefore, the portions of the West Jacobs Ranch LBA study area within the ROWs of Highway 450 and Hilight Road and the associated 100-ft buffer zones are designated unsuitable and the lease will be stipulated to exclude mining within these areas unless permits to move the highway and road are approved by Wyoming Department of Transportation and Campbell County Commissioners, respectively. |
| 4. **Wilderness Study Areas.** Federal lands designated as wilderness study areas are unsuitable for mining while under review for possible wilderness designation. | No lands in the general review area are within a wilderness study area. | There are no unsuitable findings under Criterion 4 for the West Jacobs Ranch LBA study area. |
| 5. **Scenic Areas.** Scenic federal lands designated by visual resource management analysis as Class I (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable. | No lands in the general review area meet the scenic criteria as outlined. | There are no unsuitable findings under Criterion 5 for the West Jacobs Ranch LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE WEST JACOBS RANCH LBA STUDY AREA |
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| 6. **Land Used for Scientific Study.** Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study. | Two vegetation monitoring study sites on the TBNG (NE¼ of Sec. 1, T.41N., R.71W. and NW¼ NW¼ of Sec. 30, T.41N., R.69W.), and the Hoe Creek Site (Sec. 7, T.47N., R.72W.) were found to be unsuitable under this criterion. | The vegetation monitoring sites and the Hoe Creek site are not located on the West Jacobs Ranch LBA study area. There are no unsuitable findings under Criterion 6 for the West Jacobs Ranch LBA study area. |
| 7. **Cultural Resources.** All publicly or privately owned places which are included in or are eligible for inclusion in the NRHP and an appropriate buffer zone are unsuitable. | On the basis of the consultation with SHPO, there were no unsuitable findings under this criterion in the general review area. Continue using the "Standard Archeological Stipulation" to new leases. | There are no unsuitable findings under Criterion 7 for the West Jacobs Ranch LBA study area. The "Standard Archeological Stipulation" should be applied if this tract is leased. |
| 8. **Natural Areas.** Federal lands designated as natural areas or National Natural Landmarks are unsuitable. | No lands in the general review area are designated as natural areas or as National Natural Landmarks. | There are no unsuitable findings under Criterion 8 for the West Jacobs Ranch LBA study area. |
| 9. **Critical Habitat for Threatened or Endangered Plant and Animal Species.** Federally designated critical habitat for threatened or endangered plant and animal species, and scientifically documented essential habitat for threatened or endangered species are unsuitable. | There is no federally designated critical habitat for threatened or endangered plant or animal species within the general review area. | There are no unsuitable findings under Criterion 9 for the West Jacobs Ranch LBA study area. |
| 10. **State Listed Threatened or Endangered Species.** Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as threatened or endangered shall be considered unsuitable. | Wyoming does not maintain a state list of threatened or endangered species of plants or animals. Therefore, this criterion does not apply. | There are no unsuitable findings under Criterion 10 for the West Jacobs Ranch LBA study area. |
| 11. **Bald or Golden Eagle Nests.** An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved. | Defer suitability decisions and evaluate bald and golden eagle nests on a case by case basis at the time of leasing. Establish buffer zones around nests during mining and reclamation planning after consultation with USFWS. | There are currently no bald eagle nests (active or inactive) on the West Jacobs Ranch LBA study area. There is currently one active golden eagle nest on lands within the West Jacobs Ranch LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 12. **Bald and Golden Eagle Roost and Concentration Areas.** Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed. | Defer suitability decisions and evaluate bald and golden eagle roost areas on a case by case basis prior to lease issuance. Establish buffer zones after consultation with USFWS. | There are no identified roost sites on the West Jacobs Ranch LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 13. **Falcon Nesting Sites and Buffer Zones.** Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected. | Defer suitability decisions on falcon nesting sites and evaluate on a case by case basis prior to lease issuance. Establish buffer zones around nesting sites after consultation with USFWS. | No falcon nesting sites have been identified on the West Jacobs Ranch LBA study area. There are no unsuitable findings under Criterion 13 for the West Jacobs Ranch LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE WEST JACOBS RANCH LBA STUDY AREA |
|---|---|---|
| 14. **Habitat for Migratory Bird Species.** Federal lands which are high priority habitat for migratory bird species of management concern in Wyoming shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use. | Defer suitability decisions on high priority habitat for migratory bird species of management concern in Wyoming and evaluate on a case by case basis prior to lease issuance. Establish buffer zones for nesting areas during mining and reclamation planning after consultation with USFWS. | Evaluate suitability during consultation with USFWS. |
| 15. **Fish and Wildlife Habitat for Resident Species.** Federal lands which the surface management agency and state jointly agree are fish, wildlife and plant habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable unless mining can be conducted in such a way as to ensure no long-term impact on the species being provided will occur. | Defer suitability decisions on grouse leks and evaluate on a case by case basis prior to lease issuance. Establish buffer zones after consultation with WGFD. | There are currently are no occupied (active within the last 10 years) or unoccupied (destroyed or abandoned) sage-grouse leks identified on lands within the West Jacobs Ranch LBA study area. There are currently two undetermined (no documented activity for the last 10 years, but insufficient information to designate occupied) sage-grouse leks identified on lands adjacent to the LBA tract: one approximately 1 mile south-southwest and one approximately 1.3 miles south-southwest of the West Jacobs Ranch LBA study area. Evaluate this criterion prior to lease issuance. Establish buffer zones during mining and reclamation planning after consultation with WGFD. |
| 16. **Floodplains.** Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable where it is determined that mining could not be undertaken without substantial threat of loss of life or property. | The BLM and USFS have determined that the identified floodplains in the general review area could potentially be mined. Therefore, all lands within the general review area are considered suitable. | Site-specific stipulations and resource protection safeguards will be applied if necessary during mining and reclamation planning. There are no unsuitable findings under Criterion 16 for the West Jacobs Ranch LBA study area. |
| 17. **Municipal Watersheds.** Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable. | There are no designated municipal watersheds in the general review area. | There are no unsuitable findings under Criterion 17 for the West Jacobs Ranch LBA study area. |
| 18. **National Resource Waters.** Federal lands with national resource waters, as identified by states in their water quality management plans, and ¼-mile buffer zones shall be unsuitable. | There are no designated national resource waters within the general review area. | There are no unsuitable findings under Criterion 18 for the West Jacobs Ranch LBA study area. |
| 19. **Alluvial Valley Floors.** Federal lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable. | Consider areas determined to contain AVFs significant to farming as unsuitable. Defer decisions on other AVFs and analyze on a case-by-case basis prior to lease issuance. | No AVFs or potential AVFs have been identified on the West Jacobs Ranch LBA study area with characteristics indicating potential significance to farming. There are no unsuitable findings under Criterion 19 for the West Jacobs Ranch LBA study area. |
| 20. **State or Indian Tribe Criteria.** Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable. | There are no criterion proposed by state or Indian tribes that have been approved by the Secretary of the Interior. No tribal lands are located in or near the general review area. | There are no unsuitability findings for this criterion on the West Jacobs Ranch LBA study area. |

# APPENDIX B. UNSUITABILITY CRITERIA FOR THE NORTH PORCUPINE LBA STUDY AREA

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE NORTH PORCUPINE LBA STUDY AREA |
|---|---|---|
| 1. **Federal Land Systems.** With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for mining: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers, National Recreation Areas, Lands acquired through the Land and Water Conservation Fund, National Forests and Federal lands in incorporated cities, towns and villages. | There are Federal lands located around Gillette, Sheridan, and Wright that were determined to be unsuitable under this criterion. TBNG lands are included in the North Porcupine LBA study area. The TBNG is not a proclaimed National Forest. | None of the federal lands determined to be unsuitable under Criterion 1 are present on the North Porcupine LBA study area. Therefore, there are no unsuitable findings under this criterion. |
| 2. **Rights-Of-Way and Easements.** Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial or other public purposes, on federally owned surface, are unsuitable for mining. | Portions of the BNSF & UP railroad ROWs, the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW were found to be unsuitable under this criterion within the general review area. | The portions of the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW that were determined to be unsuitable are not located on the North Porcupine LBA study area. A portion of the BNSF & UP railroad ROW that was found to be unsuitable for mining crosses the tract as applied for and under Alternative 2. Therefore, this portion of the BNSF & UP railroad ROW was designated unsuitable and the lease will be stipulated to exclude mining within the ROW. |
| 3. **Buffer Zones for Rights-Of-Way, Communities, and Buildings.** Federal lands within 100 ft of a ROW of a public road or a cemetery; or within 300 ft of any public building, school, church, community or institutional building or public park; or within 300 ft of an occupied dwelling are unsuitable for mining. | Portions of Wyoming State Highway 450, Interstate Highway I-90, and one cemetery were found to be unsuitable under this criterion. Decisions were deferred on other highways/roads, occupied dwellings, and one school until an application to lease is filed. | Highway 450, I-90, and the cemetery are not located on the North Porcupine LBA study area. No occupied dwellings or schools are located on the study area. Portions of the ROWs of the Antelope, Matheson, and Mackey roads, all county roads, are located on the tract as applied for and under Alternative 2. The relocation of the Antelope Road and a portion of the Matheson Road within the LBA study area have been approved by the Campbell County Commissioners. Therefore, the portions of the North Porcupine LBA study area within the ROWs of the Mackey Road and a portion of the Matheson Road and the associated 100-ft buffer zones are designated unsuitable for mining and the lease will be stipulated to exclude mining within these areas unless permits to move the roads are approved by Campbell County Board of Commissioners. |
| 4. **Wilderness Study Areas.** Federal lands designated as wilderness study areas are unsuitable for mining while under review for possible wilderness designation. | No lands in the general review area are within a wilderness study area. | There are no unsuitable findings under Criterion 4 for the North Porcupine LBA study area. |
| 5. **Scenic Areas.** Scenic federal lands designated by visual resource management analysis as Class I (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable. | No lands in the general review area meet the scenic criteria as outlined. | There are no unsuitable findings under Criterion 5 for the North Porcupine LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE NORTH PORCUPINE LBA STUDY AREA |
|---|---|---|
| 6. **Land Used for Scientific Study.** Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study. | Two vegetation monitoring study sites on the TBNG (NE¼ of Sec. 1, T.41N., R.71W. and NW¼ NW¼ of Sec. 30, T.41N., R.69W.), and the Hoe Creek Site (Sec. 7, T.47N., R.72W.) were found to be unsuitable under this criterion. | The vegetation monitoring sites and the Hoe Creek site are not located on the North Porcupine LBA study area. There are no unsuitable findings under Criterion 6 for the North Porcupine LBA study area. |
| 7. **Cultural Resources.** All publicly or privately owned places which are included in or are eligible for inclusion in the NRHP and an appropriate buffer zone are unsuitable. | On the basis of the consultation with SHPO, there were no unsuitable findings under this criterion in the general review area. Continue using the "Standard Archeological Stipulation" to new leases. | There are no unsuitable findings under Criterion 7 for the North Porcupine LBA study area. The "Standard Archeological Stipulation" should be applied if this tract is leased. |
| 8. **Natural Areas.** Federal lands designated as natural areas or National Natural Landmarks are unsuitable. | No lands in the general review area are designated as natural areas or as National Natural Landmarks. | There are no unsuitable findings under Criterion 8 for the North Porcupine LBA study area. |
| 9. **Critical Habitat for Threatened or Endangered Plant and Animal Species.** Federally designated critical habitat for threatened or endangered plant and animal species, and scientifically documented essential habitat for threatened or endangered species are unsuitable. | There is no federally designated critical habitat for threatened or endangered plant or animal species within the general review area. | There are no unsuitable findings under Criterion 9 for the North Porcupine LBA study area. |
| 10. **State Listed Threatened or Endangered Species.** Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as threatened or endangered shall be considered unsuitable. | Wyoming does not maintain a state list of threatened or endangered species of plants or animals. Therefore, this criterion does not apply. | There are no unsuitable findings under Criterion 10 for the North Porcupine LBA study area. |
| 11. **Bald or Golden Eagle Nests.** An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved. | Defer suitability decisions and evaluate bald and golden eagle nests on a case by case basis at the time of leasing. Establish buffer zones around nests during mining and reclamation planning after consultation with USFWS. | There are currently no bald eagle nests (active or inactive) on the North Porcupine LBA study area. There are currently two active golden eagle nests on lands within the North Porcupine LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 12. **Bald and Golden Eagle Roost and Concentration Areas.** Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed. | Defer suitability decisions and evaluate bald and golden eagle roost areas on a case by case basis prior to lease issuance. Establish buffer zones after consultation with USFWS. | There are no identified roost sites on the North Porcupine LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 13. **Falcon Nesting Sites and Buffer Zones.** Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected. | Defer suitability decisions on falcon nesting sites and evaluate on a case by case basis prior to lease issuance. Establish buffer zones around nesting sites after consultation with USFWS. | No falcon nesting sites have been identified on the North Porcupine LBA study area. There are no unsuitable findings under Criterion 13 for the North Porcupine LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE NORTH PORCUPINE LBA STUDY AREA |
|---|---|---|
| **14. Habitat for Migratory Bird Species.** Federal lands which are high priority habitat for migratory bird species of management concern in Wyoming shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use. | Defer suitability decisions on high priority habitat for migratory bird species of management concern in Wyoming and evaluate on a case by case basis prior to lease issuance. Establish buffer zones for nesting areas during mining and reclamation planning after consultation with USFWS. | Evaluate suitability during consultation with USFWS. |
| **15. Fish and Wildlife Habitat for Resident Species.** Federal lands which the surface management agency and state jointly agree are fish, wildlife and plant habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable unless mining can be conducted in such a way as to ensure no long-term impact on the species being provided will occur. | Defer suitability decisions on grouse leks and evaluate on a case by case basis prior to lease issuance. Establish buffer zones after consultation with WGFD. | There is currently one occupied (active within the last 10 years) sage-grouse lek and no unoccupied (destroyed or abandoned) sage-grouse leks identified on lands within the North Porcupine LBA study area. There are currently two occupied sage-grouse leks identified on lands adjacent to the LBA tract: both are approximately 1.5 miles southeast of the LBA study area. There is also one unoccupied/abandoned (no activity for 10 consecutive years) sage-grouse lek identified on lands adjacent to the LBA tract: approximately 0.5 mile southeast of the LBA study area. Evaluate this criterion prior to lease issuance. Establish buffer zones during mining and reclamation planning after consultation with WGFD. |
| **16. Floodplains.** Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable where it is determined that mining could not be undertaken without substantial threat of loss of life or property. | The BLM and USFS have determined that the identified floodplains in the general review area could potentially be mined. Therefore, all lands within the general review area are considered suitable. | Site-specific stipulations and resource protection safeguards will be applied if necessary during mining and reclamation planning. There are no unsuitable findings under Criterion 16 for the North Porcupine LBA study area. |
| **17. Municipal Watersheds.** Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable. | There are no designated municipal watersheds in the general review area. | There are no unsuitable findings under Criterion 17 for the North Porcupine LBA study area. |
| **18. National Resource Waters.** Federal lands with national resource waters, as identified by states in their water quality management plans, and ¼-mile buffer zones shall be unsuitable. | There are no designated national resource waters within the general review area. | There are no unsuitable findings under Criterion 18 for the North Porcupine LBA study area. |
| **19. Alluvial Valley Floors.** Federal lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable. | Consider areas determined to contain AVFs significant to farming as unsuitable. Defer decisions on other AVFs and analyze on a case-by-case basis prior to lease issuance. | No AVFs or potential AVFs have been identified on the North Porcupine LBA study area with characteristics indicating potential significance to farming. There are no unsuitable findings under Criterion 19 for the North Porcupine LBA study area. |
| **20. State or Indian Tribe Criteria.** Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable. | There are no criterion proposed by state or Indian tribes that have been approved by the Secretary of the Interior. No tribal lands are located in or near the general review area. | There are no unsuitability findings for this criterion on the North Porcupine LBA study area. |

# APPENDIX B. UNSUITABILITY CRITERIA FOR THE SOUTH PORCUPINE LBA STUDY AREA

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE SOUTH PORCUPINE LBA STUDY AREA |
|---|---|---|
| 1. **Federal Land Systems.** With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for mining: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers, National Recreation Areas, Lands acquired through the Land and Water Conservation Fund, National Forests and Federal lands in incorporated cities, towns and villages. | There are Federal lands located around Gillette, Sheridan, and Wright that were determined to be unsuitable under this criterion. TBNG lands are included in the South Porcupine LBA study area. The TBNG is not a proclaimed National Forest. | None of the federal lands determined to be unsuitable under Criterion 1 are present on the South Porcupine LBA study area. Therefore, there are no unsuitable findings under this criterion. |
| 2. **Rights-Of-Way and Easements.** Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial or other public purposes, on federally owned surface, are unsuitable for mining. | Portions of the BNSF & UP railroad ROWs, the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW were found to be unsuitable under this criterion within the general review area. | The portions of the Tri-County 230-Kv transmission line ROW, the Wyoming State Highway 450 ROW, and the I-90 ROW that were determined to be unsuitable are not located on the South Porcupine LBA study area. A portion of the BNSF & UP railroad ROW that was found to be unsuitable for mining crosses the tract configured under Alternative 2. Therefore, this portion of the BNSF & UP railroad ROW was designated unsuitable and the lease will be stipulated unsuitable to exclude mining within the ROW. |
| 3. **Buffer Zones for Rights-Of-Way, Communities, and Buildings.** Federal lands within 100 ft of a ROW of a public road or a cemetery; or within 300 ft of any public building, school, church, community or institutional building or public park; or within 300 ft of an occupied dwelling are unsuitable for mining. | Portions of Wyoming State Highway 450, Interstate Highway I-90, and one cemetery were found to be unsuitable under this criterion. Decisions were deferred on other highways/roads, occupied dwellings, and one school until an application to lease is filed. | Highway 450, I-90, and the cemetery are not located on the South Porcupine LBA study area. No occupied dwellings or schools are located on the study area. Portions of the ROW of the Antelope Road, a county road, are located on the tract as applied for and under Alternative 2. The relocation of a portion of the Antelope Road within the LBA study area has been approved by the Campbell County Commissioners. Therefore, the portions of the South Porcupine LBA study area within the ROW of a portion of the Antelope Road and the associated 100-ft buffer zone are designated unsuitable for mining and the lease will be stipulated to exclude mining within these areas unless a permit to move the road is approved by Campbell Co. Board of Commissioners. |
| 4. **Wilderness Study Areas.** Federal lands designated as wilderness study areas are unsuitable for mining while under review for possible wilderness designation. | No lands in the general review area are within a wilderness study area. | There are no unsuitable findings under Criterion 4 for the South Porcupine LBA study area. |
| 5. **Scenic Areas.** Scenic federal lands designated by visual resource management analysis as Class I (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable. | No lands in the general review area meet the scenic criteria as outlined. | There are no unsuitable findings under Criterion 5 for the South Porcupine LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE SOUTH PORCUPINE LBA STUDY AREA |
|---|---|---|
| 6. **Land Used for Scientific Study.** Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study. | Two vegetation monitoring study sites on the TBNG (NE¼ of Sec. 1, T.41N., R.71W. and NW¼ NW¼ of Sec. 30, T.41N., R.69W.), and the Hoe Creek Site (Sec. 7, T.47N., R.72W.) were found to be unsuitable under this criterion. | The vegetation monitoring sites and the Hoe Creek site are not located on the South Porcupine LBA study area. There are no unsuitable findings under Criterion 6 for the South Porcupine LBA study area. |
| 7. **Cultural Resources.** All publicly or privately owned places which are included in or are eligible for inclusion in the NRHP and an appropriate buffer zone are unsuitable. | On the basis of the consultation with SHPO, there were no unsuitable findings under this criterion in the general review area. Continue using the "Standard Archeological Stipulation" to new leases. | There are no unsuitable findings under Criterion 7 for the South Porcupine LBA study area. The "Standard Archeological Stipulation" should be applied if this tract is leased. |
| 8. **Natural Areas.** Federal lands designated as natural areas or National Natural Landmarks are unsuitable. | No lands in the general review area are designated as natural areas or as National Natural Landmarks. | There are no unsuitable findings under Criterion 8 for the South Porcupine LBA study area. |
| 9. **Critical Habitat for Threatened or Endangered Plant and Animal Species.** Federally designated critical habitat for threatened or endangered plant and animal species, and scientifically documented essential habitat for threatened or endangered species are unsuitable. | There is no federally designated critical habitat for threatened or endangered plant or animal species within the general review area. | There are no unsuitable findings under Criterion 9 for the South Porcupine LBA study area. |
| 10. **State Listed Threatened or Endangered Species.** Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as threatened or endangered shall be considered unsuitable. | Wyoming does not maintain a state list of threatened or endangered species of plants or animals. Therefore, this criterion does not apply. | There are no unsuitable findings under Criterion 10 for the South Porcupine LBA study area. |
| 11. **Bald or Golden Eagle Nests.** An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved. | Defer suitability decisions and evaluate bald and golden eagle nests on a case by case basis at the time of leasing. Establish buffer zones around nests during mining and reclamation planning after consultation with USFWS. | There are currently no bald or golden eagle nests (active or inactive) on the South Porcupine LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 12. **Bald and Golden Eagle Roost and Concentration Areas.** Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed. | Defer suitability decisions and evaluate bald and golden eagle roost areas on a case by case basis prior to lease issuance. Establish buffer zones after consultation with USFWS. | There are no identified roost sites on the South Porcupine LBA study area. Evaluate suitability prior to lease issuance during consultation with USFWS. |
| 13. **Falcon Nesting Sites and Buffer Zones.** Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected. | Defer suitability decisions on falcon nesting sites and evaluate on a case by case basis prior to lease issuance. Establish buffer zones around nesting sites after consultation with USFWS. | No falcon nesting sites have been identified on the South Porcupine LBA study area. There are no unsuitable findings under Criterion 13 for the South Porcupine LBA study area. |

| UNSUITABILITY CRITERIA | GENERAL RECOMMENDATIONS FOR BUFFALO RESOURCE AREA (BLM 1985, 2001a) | FINDINGS FOR THE SOUTH PORCUPINE LBA STUDY AREA |
|---|---|---|
| 14. **Habitat for Migratory Bird Species.** Federal lands which are high priority habitat for migratory bird species of management concern in Wyoming shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use. | Defer suitability decisions on high priority habitat for migratory bird species of management concern in Wyoming and evaluate on a case by case basis prior to lease issuance. Establish buffer zones for nesting areas during mining and reclamation planning after consultation with USFWS. | Evaluate suitability during consultation with USFWS. |
| 15. **Fish and Wildlife Habitat for Resident Species.** Federal lands which the surface management agency and state jointly agree are fish, wildlife and plant habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable unless mining can be conducted in such a way as to ensure no long-term impact on the species being provided will occur. | Defer suitability decisions on grouse leks and evaluate on a case by case basis prior to lease issuance. Establish buffer zones after consultation with WGFD. | There are currently are no occupied (active within the last 10 years) or unoccupied (destroyed or abandoned) sage-grouse leks identified on lands within the South Porcupine LBA study area or on lands within 2 miles of the LBA study area. Evaluate this criterion prior to lease issuance. Establish buffer zones during mining and reclamation planning after consultation with WGFD. |
| 16. **Floodplains.** Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable where it is determined that mining could not be undertaken without substantial threat of loss of life or property. | The BLM and USFS have determined that the identified floodplains in the general review area could potentially be mined. Therefore, all lands within the general review area are considered suitable. | Site-specific stipulations and resource protection safeguards will be applied if necessary during mining and reclamation planning. There are no unsuitable findings under Criterion 16 for the South Porcupine LBA study area. |
| 17. **Municipal Watersheds.** Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable. | There are no designated municipal watersheds in the general review area. | There are no unsuitable findings under Criterion 17 for the South Porcupine LBA study area. |
| 18. **National Resource Waters.** Federal lands with national resource waters, as identified by states in their water quality management plans, and 1/4-mile buffer zones shall be unsuitable. | There are no designated national resource waters within the general review area. | There are no unsuitable findings under Criterion 18 for the South Porcupine LBA study area. |
| 19. **Alluvial Valley Floors.** Federal lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable. | Consider areas determined to contain AVFs significant to farming as unsuitable. Defer decisions on other AVFs and analyze on a case-by-case basis prior to lease issuance. | No AVFs or potential AVFs have been identified on the South Porcupine LBA study area with characteristics indicating potential significance to farming. There are no unsuitable findings under Criterion 19 for the South Porcupine LBA study area. |
| 20. **State or Indian Tribe Criteria.** Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable. | There are no criterion proposed by state or Indian tribes that have been approved by the Secretary of the Interior. No tribal lands are located in or near the general review area. | There are no unsuitability findings for this criterion on the South Porcupine LBA study area. |

# APPENDIX C

## COAL LEASE-BY-APPLICATION FLOW CHART

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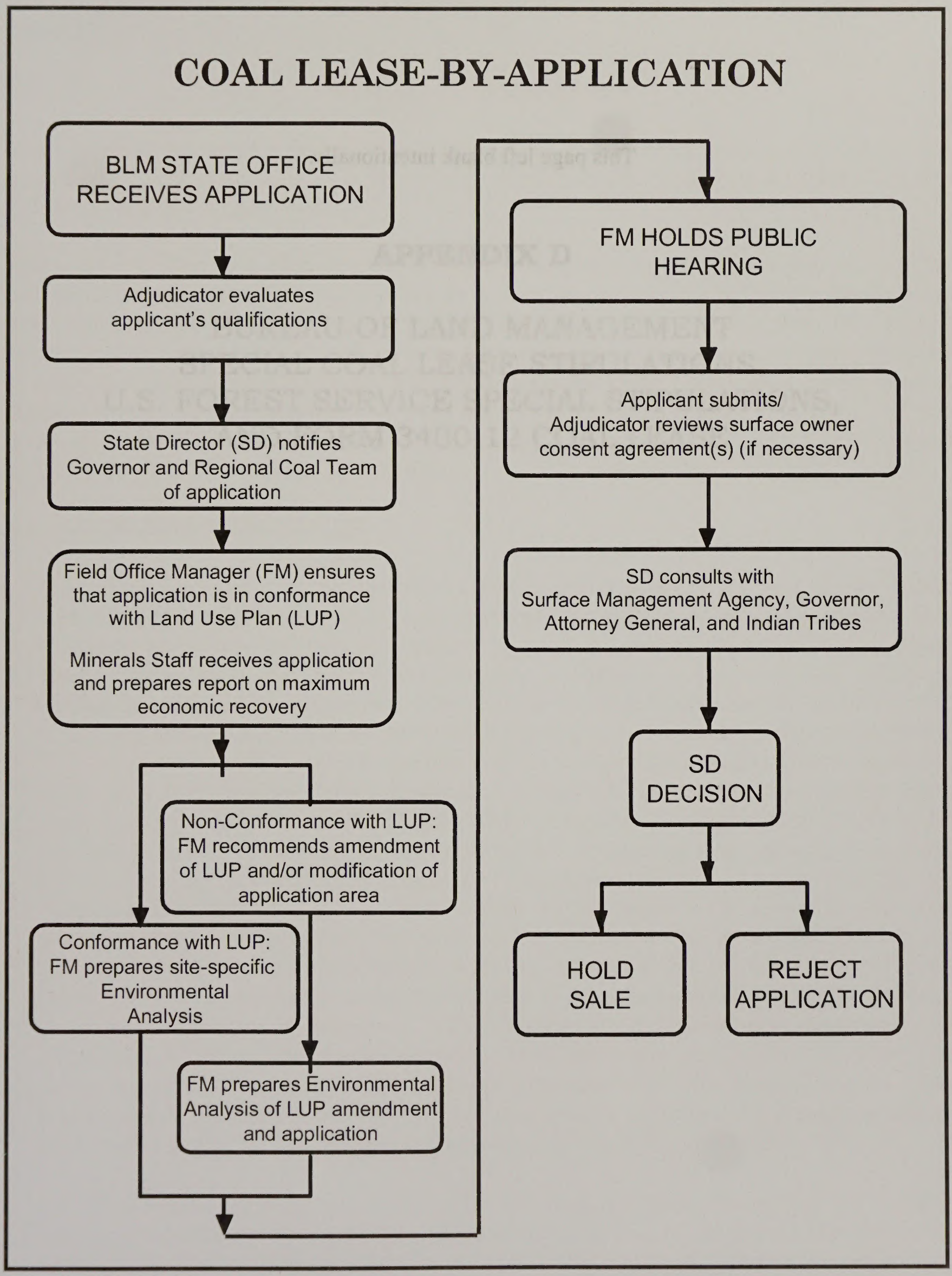
# COAL LEASE-BY-APPLICATION



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# APPENDIX D

## BUREAU OF LAND MANAGEMENT SPECIAL COAL LEASE STIPULATIONS, U.S. FOREST SERVICE SPECIAL STIPULATIONS, AND FORM 3400-12 COAL LEASE

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*BLM will attach the following special stipulations to each Wright LBA tract that is leased:*

## SPECIAL STIPULATIONS

In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following special stipulations.

These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of the lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight.

### (a) *CULTURAL RESOURCES*

(1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the Authorized Officer of the BLM or of the surface managing agency, if different, on portions of the mine plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archeologist, historian, historical architect, as appropriate), approved by the Authorized Officer of the surface managing agency (BLM, if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Regional Director of the Western Region of the Office of Surface Mining (the Western Regional Director), the Authorized Officer of the BLM, if activities are associated with coal exploration outside an approved mining permit area (hereinafter called Authorized Officer), and the Authorized Officer of the surface managing agency, if different. The lessee shall undertake measures, in accordance with instructions from the Western Regional Director, or Authorized Officer, to protect cultural resources on the leased lands. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Western Regional Director or Authorized Officer.

(2) The lessee shall protect all cultural resource properties that have been determined eligible to the National Register of Historic Places within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation

or exploration plan unless modified by mutual agreement in consultation with the State Historic Preservation Officer.

(3) The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Western Regional Director or Authorized Officer, or the Authorized Officer of the surface managing agency, if the Western Regional Director is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Western Regional Director or Authorized Officer.

Within two (2) working days of notification, the Western Regional Director or Authorized Officer will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the lessee unless otherwise specified by the Authorized Officer of the BLM or of the surface managing agency, if different.

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

**(b) *PALEONTOLOGICAL RESOURCES***

If paleontological resources, either large and conspicuous, and/or of significant scientific value are discovered during mining operations, the find will be reported to the Authorized Officer immediately. Mining operations will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM-approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological value. Operations within 250 feet of such discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operations.

**(c) *THREATENED, ENDANGERED, CANDIDATE, or OTHER SPECIAL STATUS PLANT and ANIMAL SPECIES***

(1) The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 *et seq.*, or that have other special status. The Authorized Officer may recommend modifications to exploration and development proposals to further conservation and

management objectives or to avoid activity that will contribute to a need to list such species or their habitat or to comply with any biological opinion issued by the Fish and Wildlife Service for the Proposed Action. The Authorized Officer will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act. The Authorized Officer may require modifications to, or disapprove a proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species, or result in the destruction or adverse modification of designated or proposed critical habitat.

(2) The lessee shall comply with instructions from the Authorized Officer of the surface managing agency (BLM, if the surface is private) for ground disturbing activities associated with coal exploration on federal coal leases prior to approval of a mining and reclamation permit or outside an approved mining and reclamation permit area. The lessee shall comply with instructions from the Authorized Officer of the Office of Surface Mining Reclamation and Enforcement, or his designated representative, for all ground disturbing activities taking place within an approved mining and reclamation permit area or associated with such a permit.

(3) Any potential habitat that has not already been surveyed for Ute ladies'-tresses within the project area shall be identified and surveyed prior to surface mining activities.

**(d) *MULTIPLE MINERAL DEVELOPMENT***

Operations will not be approved which, in the opinion of the Authorized Officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

**(e) *OIL AND GAS/COAL RESOURCES***

The BLM realizes that coal mining operations conducted on Federal coal leases issued within producing oil and gas fields may interfere with the economic recovery of oil and gas; just as Federal oil and gas leases issued in a Federal coal lease area may inhibit coal recovery. BLM retains the authority to alter and/or modify the resource recovery and protection plans for coal operations and/or oil and gas operations on those lands covered by Federal mineral leases so as to obtain maximum resource recovery.

**(f) *RESOURCE RECOVERY AND PROTECTION***

Notwithstanding the approval of a resource recovery and protection plan (R2P2) by the BLM, lessor reserves the right to seek damages against the operator/lessee in

the event (i) the operator/lessee fails to achieve maximum economic recovery (MER) (as defined at 43 CFR 3480.0-5(21)) of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unmineable by the operation, the operator/lessee shall submit appropriate justification to obtain approval by the Authorized Officer to leave such reserves unmined. Upon approval by the Authorized Officer, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or portion of the lease as authorized by statute and regulation.

In the event the Authorized Officer determines that the R2P2, as approved, will not attain MER as the result of changed conditions, the Authorized Officer will give proper notice to the operator/lessee as required under applicable regulations. The Authorized Officer will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the Authorized Officer that the coal reserves have been rendered unmineable or at such time that the operator/lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the Mineral Management Service demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

**(g) *PUBLIC LAND SURVEY PROTECTION***

The lessee will protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, corners or accessories are destroyed, obliterated, or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore the monuments, corners, or accessories at the same location, using surveying procedures in accordance with the "Manual of Surveying Instructions for the

Survey of the Public Lands of the United States." The survey will be recorded in the appropriate county records, with a copy sent to the Authorized Officer.

**(h) *BUFFER ZONES FOR RIGHTS-OF-WAY OF PUBLIC ROADS***

*The following special stipulation (h)(1) will be added to the West Hilight Field and West Jacobs Ranch LBA Tracts:*

(1) No mining activity of any kind may be conducted within Wyoming State Highway 450 right-of-way and associated 100-feet buffer zone while that public road remains in its current (2009) location. The lessee shall recover all legally and economically recoverable coal from all leased lands not within the foregoing right-of-way and associated buffer zone. Provided a permit to move this public highway is approved by the appropriate authority (Wyoming Department of Transportation), the lessee shall recover all legally and economically recoverable coal from all leased lands within the foregoing right-of-way and associated buffer zone. The lessee shall pay all royalties on any legally and economically recoverable coal that it fails to mine without the written permission of the Authorized Officer.

*The following special stipulation (h)(2) will be added to each Wright area LBA tract:*

(2) No mining activity of any kind may be conducted within Campbell County Road [Shroyer (CR 116), Reno (CR 83), Hilight (CR 52), Mackey (CR 69), Matheson, or Antelope (CR4)] rights-of-way and associated 100-feet buffer zones while those public roads remain in their current (2009) locations. The lessee shall recover all legally and economically recoverable coal from all leased lands not within the foregoing rights-of-way and associated buffer zones. Provided a permit to move the respective road(s) is approved by the appropriate authority (Campbell County Board of Commissioners), the lessee shall recover all legally and economically recoverable coal from all leased lands within the foregoing rights-of-way and associated buffer zones. The lessee shall pay all royalties on any legally and economically recoverable coal that it fails to mine without the written permission of the Authorized Officer.

**(i) *RAILROAD RIGHT-OF-WAY***

*The following special stipulation will be added to the South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts:*

No mining activity of any kind may be conducted on those portions of the Burlington Northern/Santa Fe and Union Pacific Railroad right-of-way that cross federally administered lands. The lessee shall recover all legally and economically recoverable coal from all leased lands not within the foregoing right-of-way. Lessee shall pay all royalties on any legally and economically recoverable coal that it fails to mine without the written permission of the Authorized Officer.

*The North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts reconfigured under Alternative 2 (the BLM study area, which is BLM's preferred alternative) include National Forest System Lands. U.S. Forest Service will attach the following special stipulations to each Wright LBA tract that is leased:*

**NOTICE FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF THE DEPARTMENT OF AGRICULTURE**

The permittee must comply with all the rules and regulations of the Secretary of Agriculture set forth in Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the permit. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of an exploration plan by the Secretary of the Interior, (2) uses of all existing improvements, such as forest development roads, within and outside the area permitted by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by an exploration plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

District Ranger
2250 East Richards
Douglas, WY 82633
Telephone: 307-358-4690

who is the authorized representative of the Secretary of Agriculture.

**NOTICE**

CULTURAL AND PALEONTOLOGICAL RESOURCES – The U.S. Department of Agriculture-Forest Service (USFS) is responsible for assuring that the leased lands are examined to determine if cultural and paleontological resources are present and to specify mitigation measures. Prior to undertaking the surface-disturbing activities on the lands covered by the lease, the lessee or operator, unless notified to the contrary by the USFS, shall:

1. Contact the USFS to determine if a site specific cultural or paleontological resource inventory is required. If a survey is required, then:

2. Engage the services of a cultural resource specialist and/or paleontologist acceptable to the USFS to conduct a cultural and/or paleontological resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to

be submitted to the USFS for review and approval at the time a surface disturbing plan of operation is submitted.

3. A cultural and/or paleontological resource assessment and mitigation proposal is required for any scientifically significant locality discovered and known to exist in the area of proposed surface disturbance. Implement measures required by the USFS and BLM to preserve or avoid destruction of cultural and paleontological resource or values. Mitigation may include relocation of proposed facilities, testing, salvage, recordation, or other protective measures. All costs of the inventory and mitigation will be borne by the lessee or operator, and all data and materials salvaged will remain under the jurisdiction of the U.S. Government as appropriate.

The discovery of any antiquities or other objects of historic or scientific interest, including but not limited to, historic or prehistoric ruins, fossils, or artifacts as the result of any operation conducted within the lease boundaries on Forest System Land shall immediately be brought to the attention of the District Ranger. The permittee will cease operations in that area until authorized to proceed by the District Ranger.

FOREST SERVICE REGION 2 SENSITIVE SPECIES – The USFS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed as sensitive by the Regional Forester. The findings of this examination may result in some restrictions to the operator's plan or even disallow use and occupancy.

ENDANGERED OR THREATENED SPECIES – The USFS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restriction to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.

The lessee/operator may, unless notified by the USFS that the examination is not necessary, conduct the examination of leased lands at this discretion and cost. This examination must be done by or under the supervision of a qualified resource specialist approved by the USFS. An acceptable report must be provided to the USFS identifying the anticipated effects of a proposed action on endangered or threatened species or their habitats, and the anticipated effects and impacts to USFS Regions 2 Sensitive Species that may occur or have habitat in the area.

Form 3400-12
(February 2005)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**COAL LEASE**

FORM APPROVED
OMB NO. 1004-0073
Expires: January 31, 2007

Serial Number

## PART 1. LEASE RIGHTS GRANTED

This lease, entered into by and between the UNITED STATES OF AMERICA, hereinafter called lessor, through the Bureau of Land Management (BLM), and *(Name and Address)*

hereinafter called lessee, is effective *(date)* / / , for a period of 20 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of the 20th lease year and each 10-year period thereafter.

Sec. 1.This lease is issued pursuant and subject to the terms and provisions of the:

☐ Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

☐ Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any bonuses, rents, and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

containing acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

## PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE -Lessee must pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $ for each lease year.

(b) RENTAL CREDITS -Rental will not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty will be percent of the value of the coal as set forth in the regulations. Royalties are due to lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the BLM may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty will be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee must maintain in the proper office a lease bond in the amount of $ . The BLM may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years will terminate the lease. Lessee must submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after lease issuance.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease will become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease will then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

(Continued on page 2)

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee must furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee must keep open at all reasonable times for the inspection by BLM the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee must allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section will be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS - Lessee must comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee must not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area must be submitted to the BLM.

Lessee must carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee must take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder and approving easements or rights-of-way. Lessor must condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY - Lessee must: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years should be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors should maintain segregated facilities.

Sec. 9. (a) TRANSFERS

☐ This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.

☐ This lease may be transferred in whole or in part to another public body or to a person who will mine coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.

☐ This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) RELINQUISHMENT - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee will be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee must deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee must remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the BLM. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, will become the property of the lessor, but lessee may either remove any or all such property or continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor will waive the requirement for removal, provided the third parties do not object to such waiver. Lessee must, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to cancellation by the lessor only by judicial proceedings. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver will not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS-IN-INTEREST - Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION -Lessee must indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES - This lease is subject to the Clean Water Act (33 U.S.C. 1252 et seq.), the Clean Air Act (42 U.S.C. 4274 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.).

Sec. 15. SPECIAL STIPULATIONS

(Continued on page 3)

Sec. 15. SPECIAL STIPULATIONS (Cont'd.) -

THE UNITED STATES OF AMERICA

_____
(Company or Lessee Name)

By _____

_____
(Signature of Lessee)

_____
(BLM)

_____
(Title)

_____
(Title)

_____
(Date)

_____
(Date)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

## NOTICES

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this application.
AUTHORITY: 30 U.S.C. 181-287 and 30 U.S.C. 351-359.
PRINCIPAL PURPOSE: BLM will use the information you provide to process your application and determine if you are eligible to hold a lease on BLM Land.
ROUTINE USES: BLM will only disclose the information according to the regulations at 43 CFR 2.56(d).
EFFECT OF NOT PROVIDING INFORMATION: Disclosing the information is necessary to receive a benefit. Not disclosing the information may result in BLM's rejecting your request for a lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:
The BLM collects this information to authorize and evaluate proposed exploration and mining operations on public lands.
Response to the provisions of this lease form is mandatory for the types of activities specified.
The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average one hour per response including the time for reading the instructions and provisions, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0073), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, Mail Stop 401 LS, Washington, D.C. 20240.

# APPENDIX E

CONVENTIONAL OIL AND GAS AND
COAL BED NATURAL GAS WELLS
CAPABLE OF PRODUCTION
LOCATED WITHIN THE BLM STUDY AREAS
FOR THE:
NORTH HILIGHT FIELD LBA TRACT
SOUTH HILIGHT FIELD LBA TRACT
WEST HILIGHT FIELD LBA TRACT
WEST JACOBS RANCH LBA TRACT
NORTH PORCUPINE LBA TRACT
SOUTH PORCUPINE LBA TRACT

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## CONVENTIONAL OIL AND GAS WELLS CAPABLE OF PRODUCTION WITHIN THE NORTH HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Name/No. | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Oil (BBL) |
|---|---|---|---|---|---|---|---|---|
| 521991 | M & K Oil Company, Inc. | So Hilight Unit No. 1-41 | 44N | 70W | NWNW Sec. 17 | PR | 237,029 | 6,861 |
| 521992 | M & K Oil Company, Inc. | So Hilight Unit No. 4-41 | 44N | 70W | NWSW Sec. 17 | PR | 18,459 | 6,880 |
| 522016 | Primary Natural Resources, Inc. | Central Hilight Unit No. 227 | 44N | 70W | NWSW Sec 18 | PR | 221,248 | 11,732 |
| 522106 | M & K Oil Company, Inc. | So Hilight Unit No. 11-53 | 44N | 70W | NWNE Sec 19 | GL | 75,417 | 3,076 |
| 522107 | M & K Oil Company, Inc. | So Hilight Unit No. 19-53 | 44N | 70W | NWSE Sec 19 | GL | 71,076 | 3,369 |
| 522283 | M & K Oil Company, Inc. | So Hilight Unit No. 18-20 | 44N | 70W | NWSW Sec 19 | GL | 458,182 | 21,197 |
| 522148 | M & K Oil Company, Inc. | So Hilight Unit No. 12-40 | 44N | 70W | NWNW Sec 20 | GL | 989,790 | 42,294 |
| 522224 | M & K Oil Company, Inc. | So Hilight Unit No. 20-40 | 44N | 70W | NWSW Sec 20 | GL | 20,914 | 783 |
| 522245 | M & K Oil Company, Inc. | So Hilight Unit No. 14-25 | 44N | 70W | NWNE Sec 21 | GL | 330,822 | 19,247 |
| 522502 | M & K Oil Company, Inc. | So Hilight Unit No. 23-12 | 44N | 70W | NWSE Sec 21 | GL | 443,628 | 9,904 |
| 522160 | M & K Oil Company, Inc. | So Hilight Unit No. 22-39 | 44N | 70W | NWSW Sec 21 | GL | 174,929 | 10,188 |
| 522031 | M & K Oil Company, Inc. | So Hilight Unit No. 13-39 | 44N | 70W | NWNW Sec 21 | GL | 265,769 | 11,895 |
| 523523 | M & K Oil Company, Inc. | Royar Fed No. 1 | 44N | 70W | NWSW Sec 22 | GL | 114,032 | 18,464 |
| 521956 | M & K Oil Company, Inc. | Pamela No. 1 | 44N | 71W | NWSW Sec 13 | GL | 304,134 | 13,360 |
| 521959 | Primary Natural Resources, Inc. | Central Hilight Unit No. 226 | 44N | 71W | NWSE Sec 13 | PR | 232,520 | 32,256 |
| 522568 | M & K Oil Company, Inc. | Pamela No. 1-A | 44N | 71W | NWSW Sec 13 | GL | 839,971 | 25,608 |
| 521925 | M & K Oil Company, Inc | Mills No. 17 | 44N | 71W | NWSE Sec 23 | PR | 115,489 | 72,057 |
| 525086 | C & H Well Service | Springen No. 1 | 44N | 71W | SENW Sec 23 | GL | 337,257 | 12,566 |
| 521845 | M & K Oil Company, Inc | So Hilight Unit No. 8-43 | 44N | 71W | NWNW Sec 24 | GL | 484,888 | 8,007 |
| 522082 | M & K Oil Company, Inc | So Hilight Unit No. 9-17 | 44N | 71W | NWNE Sec 24 | GL | 81,417 | 1,702 |

Status Codes: PR = Pumping Rods, GL = Gas Lift

Conventional oil and gas well data from WOGCC 12/13/07

## CONVENTIONAL OIL AND GAS WELLS CAPABLE OF PRODUCTION WITHIN THE SOUTH HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Name/No. | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Oil (BBL) |
|---|---|---|---|---|---|---|---|---|
| 525150 | M & K Oil Company, Inc | Porcupine Fed W30501 No. 1 | 42N | 71W | NWSW Sec. 2 | GL | 318,792 | 18,548 |

## CONVENTIONAL OIL AND GAS WELLS CAPABLE OF PRODUCTION WITHIN THE WEST HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Name/No. | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Oil (BBL) |
|---|---|---|---|---|---|---|---|---|
| 527612 | M & K Oil Company, Inc | Burton Reno No. 1 | 43N | 71W | NESW Sec. 15 | PR | 0 | 1,051 |

## CONVENTIONAL OIL AND GAS WELLS CAPABLE OF PRODUCTION WITHIN THE WEST JACOBS RANCH LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Name/No. | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Oil (BBL) |
|---|---|---|---|---|---|---|---|---|
| 521868 | M & K Oil Company, Inc | South Hilight Unit No. 34-50 | 44N | 71W | NWSE Sec. 27 | GL | 70,631 | 4,631 |

## CONVENTIONAL OIL AND GAS WELLS CAPABLE OF PRODUCTION WITHIN THE SOUTH PORCUPINE LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Name/No. | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Oil (BBL) |
|---|---|---|---|---|---|---|---|---|
| 526100 | Abraxas Petroleum Corporation | Frazier No. 11-12 | 41N | 71W | NWNW Sec. 12 | PR | 307,397 | 14,297 |

Status Codes: PR = Pumping Rods, GL = Gas Lift

Conventional oil and gas well data from WOGCC 12/13/07

## CONVENTIONAL OIL AND GAS WELLS CAPABLE OF PRODUCTION WITHIN THE NORTH PORCUPINE LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Name/No. | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Oil (BBL) |
|---|---|---|---|---|---|---|---|---|
| 527391 | DNR Oil and Gas, Inc. | Fed. W-093721C No. 19-16 | 42N | 70W | SESE Sec. 19 | FL | 1,161,304 | 9,720 |
| 524326 | DNR Oil and Gas, Inc. | Gamberg No. 1 | 42N | 70W | SWNW Sec. 26 | PR | 58,427 | 33,412 |
| 527941 | Berenergy | Janzen Fed 04315 No. 34-26 | 42N | 70W | SWSE Sec. 26 | PR | 56,191 | 52,861 |
| 521995 | Peabody Natural Gas LLC | WYO A 050890 No. 1 | 42N | 70W | SWNE Sec. 27 | GL | 1,216 | 23,944 |
| 526728 | Peabody Natural Gas LLC | Federal No. 29-2 | 42N | 70W | NWNW Sec. 29 | FL | 791,926 | 24,745 |
| 522962 | Peabody Natural Gas LLC | Federal No. 1-29 | 42N | 70W | NWNW Sec. 29 | FL | 2,802,254 | 67,697 |
| 522996 | Chaco Energy Company | Federal No. 1-23 | 42N | 71W | NWSE Sec. 23 | FL | 726,144 | 14,958 |
| 526471 | Chaco Energy Company | Exxon W-67034 No. 1-27 | 42N | 71W | SENW Sec. 23 | FL | 155,690 | 10,317 |
| 525697 | Adair Company LLC | Quillback W-67220 No. 1-34 | 42N | 71W | SWNW Sec. 34 | FL | 160,820 | 7,671 |

Status Codes: FL = Flowing, PR = Pumping Rods, GL = Gas Lift

Conventional oil and gas well data from WOGCC 12/13/07

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE NORTH HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 537396 | PRIMARY NATURAL RESOURCES INC | No. 22-19 | 44 | 70 | SE NW Sec. 19 | SI | 2,082 | 51,387 |
| 537399 | PRIMARY NATURAL RESOURCES INC | No. 11-19 | 44 | 70 | NW NW Sec. 19 | FL | 16,884 | 127,775 |
| 537400 | PRIMARY NATURAL RESOURCES INC | No. 24-19 | 44 | 70 | SE SW Sec. 19 | PS | 58,978 | 402 |
| 537861 | PRIMARY NATURAL RESOURCES INC | No. 31-19 | 44 | 70 | NW NE Sec. 19 | PS | 70,806 | 4,711 |
| 537909 | PRIMARY NATURAL RESOURCES INC | No. 13-19 | 44 | 70 | NW SW Sec. 19 | PS | 63,766 | 116,255 |
| 537854 | PRIMARY NATURAL RESOURCES INC | No. 33-19 | 44 | 70 | NW SE Sec. 19 | FL | 36,338 | 20 |
| 542731 | PRIMARY NATURAL RESOURCES INC | No. 11-20 | 44 | 70 | NW NW Sec. 20 | PS | 112,412 | 190 |
| 542732 | PRIMARY NATURAL RESOURCES INC | No. 13-20 | 44 | 70 | NW SW Sec. 20 | PS | 104,829 | 3,434 |
| 532169 | PRIMARY NATURAL RESOURCES INC | No. 22-13 | 44 | 71 | SE NW Sec. 13 | PS | 43,334 | 90 |
| 532170 | PRIMARY NATURAL RESOURCES INC | No. 31-13 | 44 | 71 | NW NE Sec. 13 | SI | 26,299 | 416,906 |
| 532171 | PRIMARY NATURAL RESOURCES INC | No. 42-13 | 44 | 71 | SE NE Sec. 13 | SI | 1,178 | 35,448 |
| 532172 | PRIMARY NATURAL RESOURCES INC | No. 33-13 | 44 | 71 | NW SE Sec. 13 | SI | 15,390 | 81,940 |
| 532174 | PRIMARY NATURAL RESOURCES INC | No. 11-13 | 44 | 71 | NW NW Sec. 13 | PS | 98,202 | 819 |
| 537397 | PRIMARY NATURAL RESOURCES INC | No. 24-13 | 44 | 71 | SE SW Sec. 13 | PS | 105,841 | 147,656 |
| 537398 | PRIMARY NATURAL RESOURCES INC | No. 13-13 | 44 | 71 | NW SW Sec. 13 | PS | 72,283 | 41,400 |
| 540283 | PRIMARY NATURAL RESOURCES INC | No. 44-13 | 44 | 71 | SE SE Sec. 13 | PS | 68,507 | 36,346 |
| 540273 | PRIMARY NATURAL RESOURCES INC | No. 31-14 | 44 | 71 | NW NE Sec. 14 | SI | 75,379 | 29,174 |
| 542582 | PRIMARY NATURAL RESOURCES INC | No. 42-14 C | 44 | 71 | SE NE Sec. 14 | PS | 102,100 | 29,231 |
| 546007 | PRIMARY NATURAL RESOURCES INC | No. 21-14 | 44 | 71 | NE NW Sec. 14 | PS | 81,487 | 12,865 |
| 548075 | C & H WELL SERVICING INC | No. 14-11 | 44 | 71 | NE SW Sec. 14 | FL | 108,211 | 0 |
| 548082 | C & H WELL SERVICING INC | No. 14-13 | 44 | 71 | SW SW Sec. 14 | FL | 108,222 | 0 |
| 549757 | PRIMARY NATURAL RESOURCES INC | No. 33-14 | 44 | 71 | NW SE Sec. 14 | FL | 129,649 | 125,512 |

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE NORTH HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 549758 | PRIMARY NATURAL RESOURCES INC | No. 12-14 | 44 | 71 | SW NW Sec. 14 | PS | 60,988 | 353,569 |
| 549759 | PRIMARY NATURAL RESOURCES INC | No. 44-14 | 44 | 71 | SE SE Sec. 14 | PS | 101,965 | 47,869 |
| 537863 | PRIMARY NATURAL RESOURCES INC | No. 42-23 | 44 | 71 | SE NE Sec. 23 | PS | 118,869 | 436,101 |
| 537864 | PRIMARY NATURAL RESOURCES INC | No. 44-23 | 44 | 71 | SE SE Sec. 23 | PS | 209,025 | 118,101 |
| 537913 | PRIMARY NATURAL RESOURCES INC | No. 31-23 | 44 | 71 | NW NE Sec. 23 | PR | 281,455 | 48,898 |
| 537914 | PRIMARY NATURAL RESOURCES INC | No. 33-23 | 44 | 71 | NW SE Sec. 23 | FL | 327,456 | 79 |
| 548079 | C & H WELL SERVICING INC | No. 23-3 | 44 | 71 | NE NW Sec. 23 | FL | 108,221 | 0 |
| 548080 | C & H WELL SERVICING INC | No. 23-5 | 44 | 71 | SW NW Sec. 23 | FL | 108,222 | 0 |
| 537432 | PRIMARY NATURAL RESOURCES INC | No. 31-24 | 44 | 71 | NW NE Sec. 24 | PS | 103,052 | 5,570 |
| 537433 | PRIMARY NATURAL RESOURCES INC | No. 42-24 | 44 | 71 | SE NE Sec. 24 | PS | 67,124 | 54,154 |
| 537865 | PRIMARY NATURAL RESOURCES INC | No. 11-24 | 44 | 71 | NW NW Sec. 24 | PS | 163,687 | 143,249 |
| 537866 | PRIMARY NATURAL RESOURCES INC | No. 22-24 | 44 | 71 | SE NW Sec. 24 | PS | 115,256 | 147,133 |
| 537867 | PRIMARY NATURAL RESOURCES INC | No. 33-24 | 44 | 71 | NW SE Sec. 24 | PS | 129,140 | 135,633 |
| 537868 | PRIMARY NATURAL RESOURCES INC | No. 44-24 | 44 | 71 | SE SE Sec. 24 | PS | 93,209 | 657,198 |
| 540188 | PRIMARY NATURAL RESOURCES INC | No. 24-24 | 44 | 71 | SE SW Sec. 24 | PS | 580,267 | 8,428 |
| 539749 | PRIMARY NATURAL RESOURCES INC | No. 13-24 | 44 | 71 | NW SW Sec. 24 | PS | 176,273 | 47,766 |
| 543700 | PRIMARY NATURAL RESOURCES INC | No. 23-24 | 44 | 71 | NE SW Sec. 24 | SI | 0 | 1,228 |
| 540280 | PRIMARY NATURAL RESOURCES INC | No. 44-26 | 44 | 71 | SE SE Sec. 26 | FL | 313,785 | 7,162 |

Status Codes: FL = Flowing, PR = Pumping Rods, PS = Pumping Submersible, SI = Shut in
CBNG well status from WOGCC database 5/14/08
Cumulative production from WOGCC database 9/25/08

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE SOUTH HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 549558 | LANCE OIL & GAS COMPANY INC | No. 21-2-4271 | 42 | 71 | NE NW Sec. 2 | SI | 0 | 0 |
| 549559 | LANCE OIL & GAS COMPANY INC | No. 23-2-4271 | 42 | 71 | NE SW Sec. 2 | SI | 0 | 0 |
| 549560 | LANCE OIL & GAS COMPANY INC | No. 12-2-4271 | 42 | 71 | SW NW Sec. 2 | SI | 0 | 0 |
| 549561 | LANCE OIL & GAS COMPANY INC | No. 14-2-4271 | 42 | 71 | SW SW Sec. 2 | SI | 0 | 0 |
| 531964 | LANCE OIL & GAS COMPANY INC | No. 14-23 | 43 | 71 | SW SW Sec. 23 | SI | 3,249 | 600,630 |
| 532513 | LANCE OIL & GAS COMPANY INC | No. 14-26 | 43 | 71 | SW SW Sec. 26 | PS | 616,055 | 272,492 |
| 532517 | LANCE OIL & GAS COMPANY INC | No. 22-26 | 43 | 71 | SE NW Sec. 26 | PS | 176,776 | 408,343 |
| 532598 | LANCE OIL & GAS COMPANY INC | No. 44-26 | 43 | 71 | SE SE Sec. 26 | PS | 218,395 | 875,111 |
| 533456 | LANCE OIL & GAS COMPANY INC | No. 32-26 | 43 | 71 | SW NE Sec. 26 | PS | 221,343 | 642,943 |
| 533363 | LANCE OIL & GAS COMPANY INC | No. 41-35 | 43 | 71 | NE NE Sec. 35 | PS | 447,631 | 396,015 |
| 533368 | LANCE OIL & GAS COMPANY INC | No. 32-35 | 43 | 71 | SW NE Sec. 35 | PS | 340,328 | 621,280 |
| 532593 | LANCE OIL & GAS COMPANY INC | No. 31-35 | 43 | 71 | NW NE Sec. 35 | PS | 199,725 | 566,180 |
| 532594 | LANCE OIL & GAS COMPANY INC | No. 22-35 | 43 | 71 | SE NW Sec. 35 | PS | 303,551 | 927,640 |
| 532596 | LANCE OIL & GAS COMPANY INC | No. 12-35 | 43 | 71 | SW NW Sec. 35 | PS | 357,528 | 803,101 |
| 532597 | LANCE OIL & GAS COMPANY INC | No. 11-35 | 43 | 71 | NW NW Sec. 35 | SI | 303,748 | 320,611 |
| 532605 | LANCE OIL & GAS COMPANY INC | No. 43-35 | 43 | 71 | NE SE Sec. 35 | SI | 268,076 | 111,517 |
| 532606 | LANCE OIL & GAS COMPANY INC | No. 42-35 | 43 | 71 | SE NE Sec. 35 | PS | 236,807 | 1,345,069 |

Status Codes: PS = Pumping Submersible, SI = Shut in
CBNG well status from WOGCC database 5/14/08
Cumulative production from WOGCC database 9/25/08

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 544726 | LANCE OIL & GAS COMPANY INC | No. 41-8-4371 | 43 | 71 | NE NE Sec. 8 | SI | 139,443 | 750,268 |
| 531544 | LANCE OIL & GAS COMPANY INC | No. 1-41-9 | 43 | 71 | NE NE Sec. 9 | PS | 382,039 | 1,261,797 |
| 544720 | LANCE OIL & GAS COMPANY INC | No. 43-9-4371 | 43 | 71 | NE SE Sec. 9 | PS | 263,551 | 0 |
| 544721 | LANCE OIL & GAS COMPANY INC | No. 34-9-4371 | 43 | 71 | SW SE Sec. 9 | FL | 194,270 | 0 |
| 544723 | LANCE OIL & GAS COMPANY INC | No. 23-9-4371 | 43 | 71 | NE SW Sec. 9 | FL | 301,841 | 0 |
| 544724 | LANCE OIL & GAS COMPANY INC | No. 21-9-4371 | 43 | 71 | NE NW Sec. 9 | FL | 327,622 | 0 |
| 544725 | LANCE OIL & GAS COMPANY INC | No. 12-9-4371 | 43 | 71 | SW NW Sec. 9 | FL | 215,636 | 0 |
| 531545 | LANCE OIL & GAS COMPANY INC | No. 1-21-10 | 43 | 71 | NE NW Sec. 10 | FL | 361,643 | 35,203 |
| 534488 | LANCE OIL & GAS COMPANY INC | No. 23-10 | 43 | 71 | NE SW Sec. 10 | SI | 284,569 | 94 |
| 544719 | LANCE OIL & GAS COMPANY INC | No. 12-10-4371 | 43 | 71 | SW NW Sec. 10 | FL | 247,875 | 0 |
| 547010 | COLEMAN OIL & GAS INC | No. 15-23 | 43 | 71 | NE SW Sec. 15 | PS | 363,597 | 817,081 |
| 547011 | COLEMAN OIL & GAS INC | No. 15-21 | 43 | 71 | NE NW Sec. 15 | PS | 628,046 | 24,307 |
| 547012 | COLEMAN OIL & GAS INC | No. 15-14 | 43 | 71 | SW SW Sec. 15 | PS | 385,379 | 306,552 |
| 547013 | COLEMAN OIL & GAS INC | No. 15-12 | 43 | 71 | SW NW Sec. 15 | PS | 524,969 | 939,012 |
| 549585 | COLEMAN OIL & GAS INC | No. 15-43 | 43 | 71 | NE SE 1 Sec. 5 | PS | 200,213 | 459,197 |
| 549586 | COLEMAN OIL & GAS INC | No. 15-41 | 43 | 71 | NE NE Sec. 15 | PS | 202,748 | 308,545 |
| 549587 | COLEMAN OIL & GAS INC | No. 15-34 | 43 | 71 | SW SE Sec. 15 | SI | 82,471 | 800,265 |
| 537926 | LANCE OIL & GAS COMPANY INC | No. 43-17-4371 | 43 | 71 | NE SE Sec. 17 | PS | 482,068 | 370,211 |
| 537927 | LANCE OIL & GAS COMPANY INC | No. 34-17-4371 | 43 | 71 | SW SE Sec. 17 | PS | 676,559 | 672,135 |
| 537929 | LANCE OIL & GAS COMPANY INC | No. 21-17-4371 | 43 | 71 | NE NW Sec. 17 | PS | 148,393 | 202,421 |
| 544755 | LANCE OIL & GAS COMPANY INC | No. 14-17-4371 | 43 | 71 | SW SW Sec. 17 | PS | 241,484 | 295,553 |
| 544756 | LANCE OIL & GAS COMPANY INC | No. 12-17-4371 | 43 | 71 | SW NW Sec. 17 | SI | 412,204 | 407,837 |

**CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)**

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 539634 | LANCE OIL & GAS COMPANY INC | No. 11-20-4371 | 43 | 71 | NW NW Sec. 20 | PS | 320,736 | 596,744 |
| 540744 | LANCE OIL & GAS COMPANY INC | No. 34-21 | 43 | 71 | SW SE Sec. 21 | PS | 517,505 | 0 |
| 540745 | LANCE OIL & GAS COMPANY INC | No. 43-21 | 43 | 71 | NE SE Sec. 21 | PS | 657,924 | 1,620 |
| 532638 | LANCE OIL & GAS COMPANY INC | No. 34-22 | 43 | 71 | SW SE Sec. 22 | FL | 175,391 | 1,289,146 |
| 534873 | LANCE OIL & GAS COMPANY INC | No. 32-22 | 43 | 71 | SW NE Sec. 22 | SI | 90,259 | 1,249,701 |
| 534874 | LANCE OIL & GAS COMPANY INC | No. 41-22 | 43 | 71 | NE NE Sec. 22 | SI | 184,428 | 1,553,507 |
| 540747 | LANCE OIL & GAS COMPANY INC | No. 23-22 | 43 | 71 | NE SW Sec. 22 | SI | 189,027 | 1,729,050 |
| 532267 | LANCE OIL & GAS COMPANY INC | No. 21-27 | 43 | 71 | NE NW Sec. 27 | PS | 265,929 | 1,452,517 |
| 532630 | LANCE OIL & GAS COMPANY INC | No. 32-27 | 43 | 71 | SW NE Sec. 27 | PS | 285,134 | 549,711 |
| 532632 | LANCE OIL & GAS COMPANY INC | No. 34-27 | 43 | 71 | SW SE Sec. 27 | PS | 417,164 | 249,697 |
| 532633 | LANCE OIL & GAS COMPANY INC | No. 42-27 | 43 | 71 | SE NE Sec. 27 | PS | 460,243 | 623,707 |
| 532634 | LANCE OIL & GAS COMPANY INC | No. 43-27 | 43 | 71 | NE SE Sec. 27 | PS | 637,195 | 376,045 |
| 540324 | LANCE OIL & GAS COMPANY INC | No. 14-28-4371 | 43 | 71 | SW SW Sec. 28 | PS | 403,631 | 226,929 |
| 549926 | LANCE OIL & GAS COMPANY INC | No. 12-28-4371 | 43 | 71 | SW NW Sec. 28 | SI | 53,920 | 199,427 |
| 549934 | LANCE OIL & GAS COMPANY INC | No. 21-28-4371 | 43 | 71 | NE NW Sec. 28 | FL | 148,092 | 68,258 |
| 549935 | LANCE OIL & GAS COMPANY INC | No. 23-28-4371 | 43 | 71 | NE SW Sec. 28 | FL | 114,007 | 40,252 |
| 549936 | LANCE OIL & GAS COMPANY INC | No. 32-28-4371 | 43 | 71 | SW NE Sec. 28 | FL | 77,960 | 294,032 |
| 549937 | LANCE OIL & GAS COMPANY INC | No. 34-28-4371 | 43 | 71 | SW SE Sec. 28 | FL | 96,592 | 2,610 |
| 549938 | LANCE OIL & GAS COMPANY INC | No. 41-28-4371 | 43 | 71 | NE NE Sec. 28 | FL | 133,522 | 278,454 |
| 549939 | LANCE OIL & GAS COMPANY INC | No. 43-28-4371 | 43 | 71 | NE SE Sec. 28 | FL | 104,009 | 5,841 |
| 532526 | LANCE OIL & GAS COMPANY INC | No. 41-34 | 43 | 71 | NE NE Sec. 34 | PS | 452,139 | 797,018 |
| 533644 | LANCE OIL & GAS COMPANY INC | No. 13-34 | 43 | 71 | NW SW Sec. 34 | SI | 157,570 | 1,636,134 |

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST HILIGHT FIELD LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 533645 | LANCE OIL & GAS COMPANY INC | No. 23-34 | 43 | 71 | NE SW Sec. 34 | FL | 591,286 | 1,348,240 |
| 533165 | LANCE OIL & GAS COMPANY INC | No. 11-34 | 43 | 71 | NW NW Sec. 34 | PS | 757,031 | 547,344 |
| 533166 | LANCE OIL & GAS COMPANY INC | No. 21-34 | 43 | 71 | NE NW Sec. 34 | FL | 153,682 | 586,568 |

Status Codes: FL = Flowing, PS = Pumping Submersible, SI = Shut in
CBNG well status from WOGCC database 5/14/08
Cumulative production from WOGCC database 9/25/08

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST JACOBS RANCH LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 544732 | LANCE OIL & GAS COMPANY INC | No. 41-3-4371 | 43 | 71 | NE NE Sec. 3 | FL | 69,015 | 0 |
| 544734 | LANCE OIL & GAS COMPANY INC | No. 32-3-4371 | 43 | 71 | SW NE Sec. 3 | FL | 88,465 | 0 |
| 544735 | LANCE OIL & GAS COMPANY INC | No. 23-3-4371 | 43 | 71 | NE SW Sec. 3 | FL | 305,019 | 0 |
| 544736 | LANCE OIL & GAS COMPANY INC | No. 21-3-4371 | 43 | 71 | NE NW Sec. 3 | FL | 85,596 | 0 |
| 544737 | LANCE OIL & GAS COMPANY INC | No. 14-3-4371 | 43 | 71 | SW SW Sec. 3 | FL | 130,906 | 0 |
| 544738 | LANCE OIL & GAS COMPANY INC | No. 12-3-4371 | 43 | 71 | SW NW Sec. 3 | FL | 107,823 | 0 |
| 534479 | LANCE OIL & GAS COMPANY INC | No. 13-4 | 43 | 71 | NW SW Sec. 4 | PS | 276,480 | 741,724 |
| 534480 | LANCE OIL & GAS COMPANY INC | No. 24-4 | 43 | 71 | SE SW Sec. 4 | PS | 244,175 | 921,871 |
| 534481 | LANCE OIL & GAS COMPANY INC | No. 33-4 | 43 | 71 | NW SE Sec. 4 | PS | 272,435 | 428,107 |
| 534482 | LANCE OIL & GAS COMPANY INC | No. 44-4 | 43 | 71 | SE SE Sec. 4 | PS | 389,513 | 419,575 |
| 544727 | LANCE OIL & GAS COMPANY INC | No. 41-4-4371 | 43 | 71 | NE NE Sec. 4 | FL | 91,385 | 0 |
| 544728 | LANCE OIL & GAS COMPANY INC | No. 32-4-4371 | 43 | 71 | SW NE Sec. 4 | FL | 150,202 | 0 |
| 544729 | LANCE OIL & GAS COMPANY INC | No. 21-4-4371 | 43 | 71 | NE NW Sec. 4 | FL | 144,050 | 0 |
| 544730 | LANCE OIL & GAS COMPANY INC | No. 12-4-4371 | 43 | 71 | SW NW Sec. 4 | FL | 178,124 | 0 |
| 534483 | LANCE OIL & GAS COMPANY INC | No. 22-5 | 43 | 71 | SE NW Sec. 5 | PS | 160,706 | 1,279,469 |
| 534484 | LANCE OIL & GAS COMPANY INC | No. 24-5 | 43 | 71 | SE SW Sec. 5 | PS | 342,966 | 855,108 |
| 534485 | LANCE OIL & GAS COMPANY INC | No. 33-5 | 43 | 71 | NW SE Sec. 5 | SI | 105,879 | 1,278,400 |
| 534486 | LANCE OIL & GAS COMPANY INC | No. 42-5 | 43 | 71 | SE NE Sec. 5 | PS | 236,036 | 936,645 |
| 534487 | LANCE OIL & GAS COMPANY INC | No. 44-5 | 43 | 71 | SE SE Sec. 5 | FL | 103,930 | 1,750,111 |
| 536461 | LANCE OIL & GAS COMPANY INC | No. 11-5-4371 | 43 | 71 | NW NW Sec. 5 | PS | 134,895 | 895,782 |
| 536462 | LANCE OIL & GAS COMPANY INC | No. 13-5-4371 | 43 | 71 | NW SW Sec. 5 | PS | 207,564 | 988,172 |
| 536463 | LANCE OIL & GAS COMPANY INC | No. 31-5-4371 | 43 | 71 | NW NE Sec. 5 | PS | 121,352 | 935,229 |
| 536468 | LANCE OIL & GAS COMPANY INC | No. 42-6-4371 | 43 | 71 | SE NE Sec. 6 | PS | 140,747 | 1,039,248 |

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST JACOBS RANCH LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 536469 | LANCE OIL & GAS COMPANY INC | No. 44-6-4371 | 43 | 71 | SE SE Sec. 6 | PS | 210,541 | 842,192 |
| 546005 | LANCE OIL & GAS COMPANY INC | No. 23-15-4471 | 44 | 71 | NE SW Sec. 15 | PS | 201,111 | 286,494 |
| 546006 | LANCE OIL & GAS COMPANY INC | No. 14-15-4471 | 44 | 71 | SW SW Sec. 15 | FL | 129,156 | 367,593 |
| 548076 | C & H WELL SERVICING INC | No. 15-15 | 44 | 71 | SW SE Sec. 15 | SI | 13,583 | 0 |
| 548081 | C & H WELL SERVICING INC | No. 15-9 | 44 | 71 | NE SE Sec. 15 | FL | 120,581 | 0 |
| 535949 | LANCE OIL & GAS COMPANY INC | No. 34-20-4471 | 44 | 71 | SW SE Sec. 20 | PS | 387,655 | 710,720 |
| 535950 | LANCE OIL & GAS COMPANY INC | No. 43-20-4471 | 44 | 71 | NE SE Sec. 20 | PS | 494,602 | 476,591 |
| 535951 | LANCE OIL & GAS COMPANY INC | No. 12-21-4471 | 44 | 71 | SW NW Sec. 21 | PS | 379,406 | 0 |
| 535952 | LANCE OIL & GAS COMPANY INC | No. 14-21-4471 | 44 | 71 | SW SW Sec. 21 | PS | 426,420 | 496,503 |
| 535953 | LANCE OIL & GAS COMPANY INC | No. 21-21-4471 | 44 | 71 | NE NW Sec. 21 | PS | 354,121 | 621,485 |
| 535954 | LANCE OIL & GAS COMPANY INC | No. 23-21-4471 | 44 | 71 | NE SW Sec. 21 | PS | 567,605 | 0 |
| 535955 | LANCE OIL & GAS COMPANY INC | No. 32-21-4471 | 44 | 71 | SW NE Sec. 21 | PS | 364,184 | 439,626 |
| 535957 | LANCE OIL & GAS COMPANY INC | No. 41-21-4471 | 44 | 71 | NE NE Sec. 21 | PS | 124,471 | 915,554 |
| 535958 | LANCE OIL & GAS COMPANY INC | No. 43-21-4471 | 44 | 71 | NE SE Sec. 21 | PS | 157,982 | 683,308 |
| 546021 | LANCE OIL & GAS COMPANY INC | No. 21-22-4471 | 44 | 71 | NE NW Sec. 22 | PS | 151,381 | 91,398 |
| 548077 | C & H WELL SERVICING INC | No. 22-1 | 44 | 71 | NE NE Sec. 22 | FL | 120,590 | 0 |
| 548078 | C & H WELL SERVICING INC | No. 22-7 | 44 | 71 | SW NE Sec. 22 | FL | 120,599 | 0 |
| 549578 | COLEMAN OIL & GAS INC | No. 14-22 | 44 | 71 | SW SW Sec. 22 | PS | 367,647 | 32,654 |
| 549579 | COLEMAN OIL & GAS INC | No. 23-22 | 44 | 71 | NE SW Sec. 22 | PS | 274,756 | 247,047 |
| 549580 | COLEMAN OIL & GAS INC | No. 34-22 | 44 | 71 | SW SE Sec. 22 | PS | 255,934 | 26,215 |
| 542192 | WILLIAMS PRODUCTION RMT COMPANY | No. 43-27-4471 | 44 | 71 | NE SE Sec. 27 | PS | 93,595 | 1,531,265 |
| 542193 | WILLIAMS PRODUCTION RMT COMPANY | No. 34-27-4471 | 44 | 71 | SW SE Sec. 27 | PS | 89,958 | 729,731 |
| 543423 | COLEMAN OIL & GAS INC | No. 12-27 | 44 | 71 | SW NW Sec. 27 | PS | 834,425 | 11,924 |

**CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST JACOBS RANCH LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)**

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 543424 | COLEMAN OIL & GAS INC | No. 21-27 | 44 | 71 | NE NW Sec. 27 | PS | 364,271 | 945,167 |
| 534527 | LANCE OIL & GAS COMPANY INC | No. 23-27 | 44 | 71 | NE SW Sec. 27 | SI | 212,140 | 954,009 |
| 549581 | COLEMAN OIL & GAS INC | No. 32-27 | 44 | 71 | SW NE Sec. 27 | PS | 123,936 | 1,717,295 |
| 549582 | COLEMAN OIL & GAS INC | No. 41-27 | 44 | 71 | NE NE Sec. 27 | PS | 187,737 | 391,852 |
| 534528 | LANCE OIL & GAS COMPANY INC | No. 23-28 | 44 | 71 | NE SW Sec. 28 | SI | 704,547 | 512,816 |
| 534529 | LANCE OIL & GAS COMPANY INC | No. 34-28 | 44 | 71 | SW SE Sec. 28 | PS | 463,893 | 433,868 |
| 534521 | LANCE OIL & GAS COMPANY INC | No. 43-28 | 44 | 71 | NE SE Sec. 28 | PS | 342,040 | 1,794 |
| 534525 | LANCE OIL & GAS COMPANY INC | No. 14-28 | 44 | 71 | SW SW Sec. 28 | PS | 378,924 | 454,369 |
| 535959 | LANCE OIL & GAS COMPANY INC | No. 12-28-4471 | 44 | 71 | SW NW Sec. 28 | SI | 372,262 | 575,436 |
| 535960 | LANCE OIL & GAS COMPANY INC | No. 21-28-4471 | 44 | 71 | NE NW Sec. 28 | PS | 372,901 | 544,767 |
| 535961 | LANCE OIL & GAS COMPANY INC | No. 32-28-4471 | 44 | 71 | SW NE Sec. 28 | PS | 532,859 | 631,155 |
| 535963 | LANCE OIL & GAS COMPANY INC | No. 12-29-4471 | 44 | 71 | SW NW Sec. 29 | PS | 261,157 | 1,228,824 |
| 535964 | LANCE OIL & GAS COMPANY INC | No. 14-29-4471 | 44 | 71 | SW SW Sec. 29 | PS | 306,880 | 1,177,938 |
| 535965 | LANCE OIL & GAS COMPANY INC | No. 21-29-4471 | 44 | 71 | NE NW Sec. 29 | PS | 355,889 | 883,960 |
| 535966 | LANCE OIL & GAS COMPANY INC | No. 23-29-4471 | 44 | 71 | NE SW Sec. 29 | PS | 297,850 | 1,015,025 |
| 535967 | LANCE OIL & GAS COMPANY INC | No. 32-29-4471 | 44 | 71 | SW NE Sec. 29 | PS | 619,777 | 418,818 |
| 535968 | LANCE OIL & GAS COMPANY INC | No. 41-29-4471 | 44 | 71 | NE NE Sec. 29 | PS | 219,136 | 1,223,387 |
| 534522 | LANCE OIL & GAS COMPANY INC | No. 34-29 | 44 | 71 | SW SE Sec. 29 | PS | 201,310 | 1,135,249 |
| 534523 | LANCE OIL & GAS COMPANY INC | No. 43-29 | 44 | 71 | NE SE Sec. 29 | PS | 295,813 | 1,402,139 |
| 546026 | LANCE OIL & GAS COMPANY INC | No. 43-30-4471 | 44 | 71 | NE SE Sec. 30 | FL | 167,907 | 216,260 |
| 546027 | LANCE OIL & GAS COMPANY INC | No. 41-30-4471 | 44 | 71 | NE NE Sec. 30 | SI | 106,873 | 736,700 |
| 546033 | LANCE OIL & GAS COMPANY INC | No. 42-31-4471 | 44 | 71 | SE NE Sec. 31 | PS | 181,844 | 324,556 |

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE WEST JACOBS RANCH LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 534535 | LANCE OIL & GAS COMPANY INC | No. 23-32 | 44 | 71 | NE SW Sec. 32 | SI | 290,498 | 988,703 |
| 534536 | LANCE OIL & GAS COMPANY INC | No. 32-32 | 44 | 71 | SW NE Sec. 32 | PS | 621,996 | 882,067 |
| 534537 | LANCE OIL & GAS COMPANY INC | No. 34-32 | 44 | 71 | SW SE Sec. 32 | PS | 310,217 | 1,589,150 |
| 534538 | LANCE OIL & GAS COMPANY INC | No. 41-32 | 44 | 71 | NE NE Sec. 32 | PS | 287,555 | 626,905 |
| 534539 | LANCE OIL & GAS COMPANY INC | No. 43-32 | 44 | 71 | NE SE Sec. 32 | PS | 388,317 | 850,984 |
| 534875 | LANCE OIL & GAS COMPANY INC | No. 14-33 | 44 | 71 | SW SW Sec. 33 | PS | 430,396 | 338,006 |
| 534876 | LANCE OIL & GAS COMPANY INC | No. 21-33 | 44 | 71 | NE NW Sec. 33 | FL | 303,919 | 800,171 |
| 534877 | LANCE OIL & GAS COMPANY INC | No. 23-33 | 44 | 71 | NE SW Sec. 33 | SI | 593,893 | 826,723 |
| 534878 | LANCE OIL & GAS COMPANY INC | No. 32-33 | 44 | 71 | SW NE Sec. 33 | PS | 215,367 | 601,659 |
| 534879 | LANCE OIL & GAS COMPANY INC | No. 34-33 | 44 | 71 | SW SE Sec. 33 | PS | 418,934 | 342,822 |
| 534880 | LANCE OIL & GAS COMPANY INC | No. 41-33 | 44 | 71 | NE NE Sec. 33 | PS | 200,906 | 0 |
| 534881 | LANCE OIL & GAS COMPANY INC | No. 43-33 | 44 | 71 | NE SE Sec. 33 | PS | 436,217 | 570,150 |
| 534524 | LANCE OIL & GAS COMPANY INC | No. 12-33 | 44 | 71 | SW NW Sec. 33 | PS | 206,604 | 912,817 |
| 549583 | COLEMAN OIL & GAS INC | No. 32-34 | 44 | 71 | SW NE Sec. 34 | PS | 536,090 | 68,793 |
| 549584 | COLEMAN OIL & GAS INC | No. 41-34 | 44 | 71 | NE NE Sec. 34 | PS | 387,165 | 14,983 |
| 544712 | LANCE OIL & GAS COMPANY INC | No. 43-34-4471 | 44 | 71 | NE SE Sec. 34 | FL | 349,252 | 21,277 |
| 544713 | LANCE OIL & GAS COMPANY INC | No. 34-34-4471 | 44 | 71 | SW SE Sec. 34 | SI | 59,208 | 28,339 |
| 544714 | LANCE OIL & GAS COMPANY INC | No. 23-34-4471 | 44 | 71 | NE SW Sec. 34 | SI | 59,637 | 299,634 |
| 544715 | LANCE OIL & GAS COMPANY INC | No. 21-34-4471 | 44 | 71 | NE NW Sec. 34 | PS | 332,425 | 41,665 |
| 544716 | LANCE OIL & GAS COMPANY INC | No. 14-34-4471 | 44 | 71 | SW SW Sec. 34 | PS | 77,875 | 30,209 |
| 544717 | LANCE OIL & GAS COMPANY INC | No. 12-34-4471 | 44 | 71 | SW NW Sec. 34 | SI | 48,888 | 67,960 |

Status Codes: FL = Flowing, PS = Pumping Submersible, SI = Shut in
CBNG well status from WOGCC database 5/14/08
Cumulative production from WOGCC database 9/25/08

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE NORTH PORCUPINE LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 553824 | BILL BARRETT CORPORATION | No. 14-19-4270 | 42 | 70 | SW SW Sec. 19 | FL | 158,844 | 94,832 |
| 553826 | BILL BARRETT CORPORATION | No. 43-19-4270 | 42 | 70 | NE SE Sec. 19 | FL | 162,640 | 129,535 |
| 553069 | BILL BARRETT CORPORATION | No. 23-19-4270 | 42 | 70 | NE SW Sec. 19 | FL | 150,317 | 120,810 |
| 553070 | BILL BARRETT CORPORATION | No. 32-19-4270 | 42 | 70 | SW NE Sec. 19 | FL | 107,068 | 5,755 |
| 553827 | BILL BARRETT CORPORATION | No. 12-20-4270 | 42 | 70 | SW NW Sec. 20 | FL | 109,341 | 55,394 |
| 553828 | BILL BARRETT CORPORATION | No. 14-20-4270 | 42 | 70 | SW SW Sec. 20 | FL | 150,425 | 38,735 |
| 553830 | BILL BARRETT CORPORATION | No. 23-20-4270 | 42 | 70 | NE SW Sec. 20 | FL | 131,326 | 22,922 |
| 553831 | BILL BARRETT CORPORATION | No. 34-20-4270 | 42 | 70 | SW SE Sec. 20 | FL | 168,747 | 6,501 |
| 554339 | BILL BARRETT CORPORATION | No. 12-21-4270 | 42 | 70 | SW NW Sec. 21 | FL | 89,236 | 224,189 |
| 554340 | BILL BARRETT CORPORATION | No. 14-21-4270 | 42 | 70 | SW SW Sec. 21 | FL | 159,249 | 1,121 |
| 554341 | BILL BARRETT CORPORATION | No. 23-21-4270 | 42 | 70 | NE SW Sec. 21 | FL | 99,629 | 44,967 |
| 546208 | PEABODY NATURAL GAS LLC | No. 21-30 | 42 | 70 | NE NW Sec. 30 | FL | 98,106 | 224,138 |
| 546595 | PEABODY NATURAL GAS LLC | No. 11-30 | 42 | 70 | NW NW Sec. 30 | FL | 165,500 | 129,992 |
| 554333 | PEABODY NATURAL GAS LLC | No. 41-30-42-70 | 42 | 70 | NE NE Sec. 30 | FL | 44,028 | 0 |
| 551233 | BILL BARRETT CORPORATION | No. 43-22-42-71 | 42 | 71 | NE SE Sec. 22 | FL | 126,879 | 4,258 |
| 551256 | BILL BARRETT CORPORATION | No. 32-22-42-71 | 42 | 71 | SW NE Sec. 22 | FL | 119,343 | 86,484 |
| 551257 | BILL BARRETT CORPORATION | No. 34-22-42-71 | 42 | 71 | SW SE Sec. 22 | FL | 132,170 | 3,171 |
| 553799 | BILL BARRETT CORPORATION | No. 12-23-4271 | 42 | 71 | SW NW Sec. 23 | FL | 91,009 | 0 |
| 553800 | BILL BARRETT CORPORATION | No. 14-23-4271 | 42 | 71 | SW SW Sec. 23 | FL | 106,161 | 1,178 |
| 553802 | BILL BARRETT CORPORATION | No. 23-23-4271 | 42 | 71 | NE SW Sec. 23 | FL | 102,721 | 128 |
| 553803 | BILL BARRETT CORPORATION | No. 32-23-4271 | 42 | 71 | SW NE Sec. 23 | FL | 92,012 | 174,071 |
| 553804 | BILL BARRETT CORPORATION | No. 34-23-4271 | 42 | 71 | SW SE Sec. 23 | FL | 171,448 | 2,095 |

## CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE NORTH PORCUPINE LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 553806 | BILL BARRETT CORPORATION | No. 43-23-4271 | 42 | 71 | NE SE Sec. 23 | FL | 119,511 | 55,932 |
| 553066 | BILL BARRETT CORPORATION | No. 12-24-4271 | 42 | 71 | SW NW Sec. 24 | FL | 89,066 | 73,802 |
| 554344 | BILL BARRETT CORPORATION | No. 34-24-4271 | 42 | 71 | SW SE Sec. 24 | FL | 203,172 | 96,245 |
| 554302 | PEABODY NATURAL GAS LLC | No. 41-25-42-71 | 42 | 71 | NE NE Sec. 25 | FL | 36,334 | 18,985 |
| 549603 | PEABODY NATURAL GAS LLC | No. 23-26 | 42 | 71 | NE SW Sec. 26 | FL | 192,600 | 399,035 |
| 549605 | PEABODY NATURAL GAS LLC | No. 12-26 | 42 | 71 | SW NW Sec. 26 | FL | 347,164 | 371,250 |
| 549606 | PEABODY NATURAL GAS LLC | No. 14-26 | 42 | 71 | SW SW Sec. 26 | FL | 301,557 | 361 |
| 554299 | PEABODY NATURAL GAS LLC | No. 41-26-42-71 | 42 | 71 | NE NE Sec. 26 | FL | 103,061 | 17,939 |
| 554301 | PEABODY NATURAL GAS LLC | No. 21-26-42-71 | 42 | 71 | NE NW Sec. 26 | SI | 94,838 | 4,090 |
| 551234 | BILL BARRETT CORPORATION | No. 12-27-42-71 | 42 | 71 | SW NW Sec. 27 | FL | 100,862 | 217,113 |
| 551235 | BILL BARRETT CORPORATION | No. 14-27-42-71 | 42 | 71 | SW SW Sec. 27 | FL | 128,032 | 45 |
| 551236 | BILL BARRETT CORPORATION | No. 21-27-42-71 | 42 | 71 | NE NW Sec. 27 | FL | 129,910 | 39,872 |
| 551237 | BILL BARRETT CORPORATION | No. 23-27-42-71 | 42 | 71 | NE SW Sec. 27 | FL | 120,939 | 260,318 |
| 552018 | BILL BARRETT CORPORATION | No. 12-34-42-71 | 42 | 71 | SW NW Sec. 34 | FL | 90,190 | 12,922 |
| 552019 | BILL BARRETT CORPORATION | No. 21-34-42-71 | 42 | 71 | NE NW Sec. 34 | FL | 112,325 | 146,873 |
| 552020 | BILL BARRETT CORPORATION | No. 32-34-42-71 | 42 | 71 | SW NE Sec. 34 | FL | 104,917 | 4 |
| 552021 | BILL BARRETT CORPORATION | No. 41-34-42-71 | 42 | 71 | NE NE Sec. 34 | FL | 119,577 | 203 |
| 554295 | PEABODY NATURAL GAS LLC | No. 23-35-42-71 | 42 | 71 | NE SW Sec. 35 | FL | 71,181 | 983 |
| 554296 | PEABODY NATURAL GAS LLC | No. 21-35-42-71 | 42 | 71 | NE NW Sec. 35 | FL | 84,036 | 0 |
| 554297 | PEABODY NATURAL GAS LLC | No. 14-35-42-71 | 42 | 71 | SW SW Sec. 35 | FL | 65,396 | 35,057 |
| 554298 | PEABODY NATURAL GAS LLC | No. 12-35-42-71 | 42 | 71 | SW NW Sec. 35 | FL | 94,308 | 0 |

Status Codes: FL = Flowing, SI = Shut in
CBNG well status from WOGCC database 5/14/08
Cumulative production from WOGCC database 9/25/08

**CBNG WELLS CAPABLE OF PRODUCTION WITHIN THE SOUTH PORCUPINE LBA TRACT AS APPLIED FOR AND LANDS ADDED BY BLM'S STUDY AREA (Continued)**

| API Number (Short) | Company | Well Number | TWP | RNG | Location | WOGCC Status | Cumulative Production Gas (MCF) | Cumulative Production Water (BBL) |
|---|---|---|---|---|---|---|---|---|
| 554303 | PEABODY NATURAL GAS LLC | No. 23-1-41-71 | 41 | 71 | NE SW Sec. 1 | FL | 92,735 | 1,482 |
| 554304 | PEABODY NATURAL GAS LLC | No. 21-1-41-71 | 41 | 71 | NE NW Sec. 1 | SI | 14,027 | 190,852 |
| 554305 | PEABODY NATURAL GAS LLC | No. 14-1-41-71 | 41 | 71 | SW SW Sec. 1 | FL | 72,611 | 1,936 |
| 554306 | PEABODY NATURAL GAS LLC | No. 12-1-41-71 | 41 | 71 | SW NW Sec. 1 | FL | 54,434 | 102,432 |
| 554226 | YATES PETROLEUM CORPORATION | No. 8 | 41 | 71 | NE SE Sec. 10 | FL | 62,256 | 15,237 |
| 554212 | YATES PETROLEUM CORPORATION | No. 2 | 41 | 71 | NE SW Sec. 11 | SI | 61,213 | 19,834 |
| 551248 | BILL BARRETT CORPORATION | No. 34-11-41-71 | 41 | 71 | SW SE Sec. 11 | FL | 114,053 | 331,115 |
| 551249 | BILL BARRETT CORPORATION | No. 43-11-41-71 | 41 | 71 | NE SE Sec. 11 | FL | 148,753 | 1 |
| 553817 | BILL BARRETT CORPORATION | No. 12-12-4171 | 41 | 71 | SW NW Sec. 12 | FL | 74,985 | 11,673 |
| 553818 | BILL BARRETT CORPORATION | No. 14-12-4171 | 41 | 71 | SW SW Sec. 12 | FL | 96,934 | 69 |
| 553819 | BILL BARRETT CORPORATION | No. 23-12-4171 | 41 | 71 | NE SW Sec. 12 | FL | 93,435 | 45,785 |
| 554210 | YATES PETROLEUM CORPORATION | No. 1 | 41 | 71 | SW SW Sec. 13 | FL | 74,705 | 16 |

Status Code: FL = Flowing, SI = Shut-In
CBNG well status from WOGCC 5/14/08
Cumulative production data from WOGCC 9/25/08

# APPENDIX F

# SUPPLEMENTAL AIR QUALITY INFORMATION

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## F-1.0 INTRODUCTION

The purpose of this appendix is to provide background information on air quality issues, including the regulatory framework, regional air quality conditions, dispersion model methodologies, and the Best Available Control Technology (BACT) process.

The air quality discussion in Chapter 3 of this EIS focuses on potential air quality impacts specific to the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines and the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts (Figure F-1). Cumulative air quality-related impacts associated with coal leasing in the Powder River Basin (PRB) of Wyoming are addressed in Section 4.2.3 of this EIS, which summarizes the results the Task 1A (Current Air Quality Conditions), Task 3A (Cumulative Air Quality Effects), and Task 3A Supplemental (Cumulative Air Quality Effects for 2015) Reports of the Powder River Basin Coal Review, prepared by the ENSR Corporation for the BLM Wyoming State Office, BLM Wyoming High Plains District Office, and BLM Montana Miles City Field Office, September 2005 (Tasks 1A and 3A) and October 2008 (Task 3A Supplemental).

## F-2.0 REGULATORY FRAMEWORK

Ambient air quality and air pollution emissions are regulated under federal and state laws and regulations. In Wyoming, the Wyoming Department of Environmental Quality/Air Quality Division (WDEQ/AQD) is responsible for managing air quality through state regulations promulgated in the Wyoming Air Quality Standards and Regulations (WAQSR) and through the Wyoming State Implementation Plan (SIP). WDEQ/AQD has also been delegated authority by the U.S. Environmental Protection Agency (EPA) to implement federal programs of the Clean Air Act Amendment of 1990 (CAAA).

The WDEQ/AQD implements WAQSR and CAAA requirements through various air permitting programs. A proponent initiating a project must undergo new source review and obtain a pre-construction permit or a permit waiver authorizing construction of the project. This process ensures that the project will comply with the air quality requirements at the time of construction. To ensure on-going compliance, WDEQ/AQD also implements an operating permit program that can require on-going monitoring of emissions sources and/or source control systems.

### F-2.1 National Ambient Air Quality Standards

The Clean Air Act (CAA) requires EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. These standards define the maximum level of air pollution allowed in the ambient air. The CAA established NAAQS for six pollutants, known as "criteria" pollutants, which "...cause or contribute to air pollution which may be reasonably anticipated to

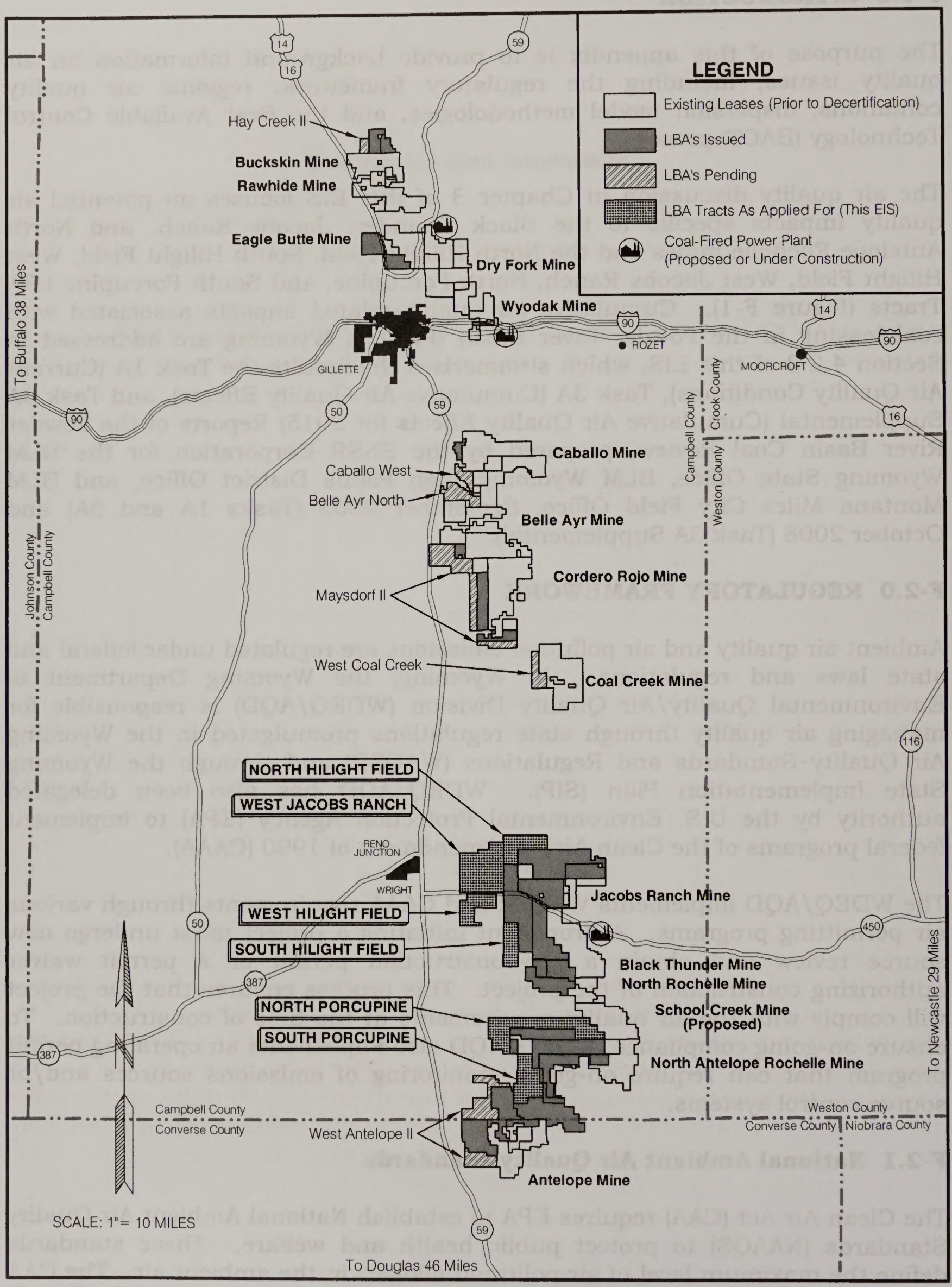


Figure F-1. General Location Map with Federal Coal Leases and LBA Tracts.

endanger public health or welfare and the presence of which in the ambient air results from numerous or diverse mobile or stationary sources." The six, present-day criteria pollutants are lead, nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), ozone ($O_3$) and particulate matter ($PM_{10}$ and $PM_{2.5}$), where $PM_{10}$ is coarse particulate with mean aerodynamic diameter of 10 microns or less and $PM_{2.5}$ is fine particulate with a diameter of 2.5 microns or less.

The CAA and CAAA allow states to promulgate additional ambient air standards that are at least as stringent, or more stringent, than the NAAQS. A list of the criteria pollutants regulated by the CAA, and the currently applicable NAAQS set by the EPA for each, is presented in Table F-1. The Wyoming Ambient Air Quality Standards, or WAAQS, set by the WDEQ/AQD are also listed in this table. In some instances, the Wyoming standards are more stringent than the NAAQS.

During the new source review process, applicants must demonstrate that the facility will not cause or significantly contribute to exceedance of these standards. These demonstrations are made via atmospheric dispersion modeling or other means, including monitoring data approved by the WDEQ/AQD administrator.

## F-2.2 Attainment/Non-Attainment Area Designations

Pursuant to the CAA, EPA has developed a method for classifying existing air quality in distinct geographic regions known as air basins, or air quality control regions, and/or Metropolitan Statistical Areas (MSAs). For each federal criteria pollutant, each air basin (or portion of a basin or MSA) is classified as in "attainment" if the area has "attained" compliance with (that is, not exceeded) the adopted NAAQS for that pollutant, or is classified as in "non-attainment" if the levels of ambient air pollution exceed the NAAQS for that pollutant. Areas for which sufficient ambient monitoring data are not available to define attainment status are designated as "unclassified" for those particular pollutants.

States use the EPA method to designate areas within their borders as being in "attainment" or "non-attainment" with the NAAQS. Existing air quality throughout most of the PRB in Wyoming, including the general Wright analysis area, is designated an attainment area for all pollutants. However, the town of Sheridan, Wyoming, located in Sheridan County about 150 miles northwest of the general Wright analysis area, is a moderate non-attainment area for $PM_{10}$ due to localized sources and activity within the town. There are no other non-attainment areas within 150 miles of the project area.

Table F-1. Assumed Background Air Pollutant Concentrations, Applicable AAQS, and PSD Increment Values (in $\mu g/m^3$).

| Criteria Pollutant | Averaging Time[1] | Background Concentration | Primary NAAQS[2] | Secondary NAAQS[2] | WAAQS | PSD Class I Increments[3] | PSD Class II Increments[3] |
|---|---|---|---|---|---|---|---|
| Carbon monoxide | 1-hour | 3,336[4] | 40,000 | 40,000 | 40,000 | --- | --- |
| | 8-hour | 1,381 | 10,000 | 10,000 | 10,000 | --- | --- |
| Nitrogen dioxide | 1-hour[5] | --- | 188.1 | --- | --- | --- | --- |
| | Annual | 25[6] | 100 | 100 | 100 | 2.5 | 25 |
| Ozone | 8-hour | 133[6] | 147 | 147 | 157 | --- | --- |
| Sulfur dioxide | 3-hour | 157[7] | --- | 1,300 | 1,300 | 25 | 512 |
| | 24-hour | 68[7] | 365 | --- | 260 | 5 | 91 |
| | Annual | 9[7] | 80 | --- | 60 | 2 | 20 |
| $PM_{10}$[8] | 24-hour | 103[9] | 150 | 150 | 150 | 8 | 30 |
| | Annual | 26[9] | --- | --- | 50 | 4 | 17 |
| $PM_{2.5}$[8] | 24-hour | 18.9[10] | 35 | 35 | 65 | --- | --- |
| | Annual | 6.4[10] | 15 | 15 | 15 | --- | --- |

1 Annual standards are not to be exceeded; short-term standards are not to be exceeded more than once per year.

2 Primary standards are designed to protect public health; secondary standards are designed to protect public welfare.

3 All NEPA analysis comparisons to the PSD increments are intended to evaluate a threshold of concern and do not represent a regulatory PSD Increment Consumption Analysis.

4 Data collected by Amoco at Ryckman Creek for an eight-month period during 1978-1979, summarized in Riley Ridge EIS (BLM 1983).

5 EPA set a new 1-hour $NO_2$ standard at 0.100 ppm (188.1 $\mu g/m^3$) effective January 22, 2010. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.

6 Data collected at WDEQ/AQD site located 15 miles SSW of Gillette, Wyoming. (Annual = average of mean annual values in 2005-2008. 8-hr = average of four highest 8-hr values in 2005-2008).

7 Data collected at Wyodak Site 4, Campbell County, Wyoming. (Annual = average of mean annual values in 2005-2008. 24-hr and 3-hr = average of two highest 24-hr and 3-hr values in 2005-2008.)

8 On October 17, 2006, EPA published final revisions to the NAAQS for particulate matter that took effect on December 18, 2006. The revision strengthens the 24-hour $PM_{2.5}$ standard from 65 to 35 $\mu g/m^3$ and revokes the annual $PM_{10}$ standard of 50 $\mu g/m^3$. The State of Wyoming will enter into rulemaking to revise the WAAQS.

9 Data collected at the Jacobs Ranch Mine, Site 5, Campbell County, Wyoming. (Annual = average of mean annual values in 2005-2008. 24-hr = average of four highest 24-hr values in 2005-2008.)

10 Data collected at the Black Thunder Mine, Site BTM-26-2, Campbell County, Wyoming. (Annual = average of mean annual values in 2005-2008. 24-hr = average of 98th percentile values in 2005-2008.)

Source: BLM 2005b, EPA 2009a, and WDEQ/AQD

## F-2.3 Prevention of Significant Deterioration

Under requirements of the CAA, EPA has established Prevention of Significant Deterioration (PSD) rules, intended to prevent deterioration of air quality in attainment (and unclassifiable) areas. Increases in ambient concentrations of $NO_2$, $SO_2$, and $PM_{10}$ are limited to modest increments above the existing or "baseline" air quality in most attainment areas of the country (Class II areas discussed below), and to very small incremental increases in pristine attainment areas (Class I areas discussed below).

For the purposes of PSD, EPA has categorized each attainment area within the United States into one of three PSD area classifications. PSD Class I is the most restrictive air quality category, and was created by Congress to prevent further deterioration of air quality in national and international parks, national memorial parks and national wilderness areas of a given size threshold which were in existence prior to 1977, or those additional areas which have since been designated Class I under federal regulations (40 CFR 52.21). All remaining areas outside of the designated Class I boundaries were designated Class II areas, which allow a relatively greater deterioration of air quality over that in existence in 1977, although still within the NAAQS. No Class III areas, which would allow further degradation, have been designated.

The federal land managers have also identified certain federal assets with Class II status as "sensitive" Class II areas for which air quality and/or visibility are valued resources.

Table F-2 is a list of mandatory federal Class I areas, tribal Class I areas, and federal Class II areas that are of special interest in the region and their distance from the general Wright analysis area. The closest Class I area to the general Wright analysis area is Wind Cave National Park in South Dakota, located about 91 miles to the east. The next closest Class I area is the Northern Cheyenne Indian Reservation (tribal federal Class I area), located about 132 miles to the north-northwest. The closest sensitive Class II areas are the Devils Tower National Monument and the Jewel Cave National Monument, which are approximately 70 miles north-northeast and 74 miles east of the general Wright analysis area, respectively.

PSD regulations limit the maximum allowable increase (increment) in ambient $PM_{10}$ in a Class I airshed resulting from major stationary sources or major modifications to 4 $\mu g/m^3$ (annual geometric mean) and 8 $\mu g/m^3$ (24-hour average). Increases in other criteria pollutants are similarly limited. Specific types of facilities listed in the PSD rules which emit, or have the potential to emit, 100 tons per year or more of $PM_{10}$ or other criteria air pollutants, or any other facility which emits, or has the potential to emit, 250 tons per year or more of $PM_{10}$ or other criteria air pollutants, are considered major stationary sources and must therefore demonstrate compliance with those incremental standards during the new source permitting process. However, fugitive emissions are not counted against the PSD major source applicability threshold

Table F-2. Approximate Distances and Directions from the General Wright Analysis Area to Mandatory Federal PSD Class I, Tribal Federal PSD Class I, and Federal PSD Class II Areas.

| Receptor Area | Distance (miles) | Direction to Receptor |
|---|---|---|
| **Mandatory Federal PSD Class I Area** | | |
| Badlands Wilderness Area[1] | 143 | E |
| Bridger Wilderness Area | 199 | WSW |
| Fitzpatrick Wilderness Area | 207 | W |
| Gates of the Mountain Wilderness Area | 382 | NW |
| Grand Teton National Park | 254 | W |
| North Absaroka Wilderness Area | 213 | WNW |
| Red Rocks Lake Wilderness Area | 320 | WNW |
| Scapegoat Wilderness Area | 426 | NW |
| Teton Wilderness Area | 221 | W |
| Theodore Roosevelt National Park (North Unit) | 290 | NNE |
| Theodore Roosevelt National Park (South Unit) | 242 | NNE |
| U.L. Bend Wilderness Area | 290 | NNW |
| Washakie Wilderness Area | 187 | W |
| Wind Cave National Park | 91 | E |
| Yellowstone National Park | 235 | WNW |
| **Tribal Federal PSD Class I** | | |
| Fort Peck Indian Reservation | 301 | N |
| Northern Cheyenne Indian Reservation | 132 | NNW |
| **Federal PSD Class II** | | |
| Absaroka-Beartooth Wilderness Area | 224 | WNW |
| Agate Fossil Beds National Monument | 114 | SE |
| Badlands National Park | 121 | E |
| Bighorn Canyon National Recreation Area | 166 | NW |
| Black Elk Wilderness Area | 88 | E |
| Cloud Peak Wilderness Area | 93 | WNW |
| Crow Indian Reservation | 124 | NW |
| Devils Tower National Monument | 70 | NNE |
| Fort Belknap Indian Reservation | 327 | NNW |
| Fort Laramie National Historic Site | 108 | SSE |
| Jewel Cave National Monument | 74 | E |
| Mount Rushmore National Memorial | 94 | E |
| Popo Agie Wilderness Area | 194 | WSW |
| Soldier Creek Wilderness Area | 106 | SE |

[1] The U.S. Congress designated the Wilderness Area portion of Badlands National Park as a mandatory Federal PSD Class I area. The remainder of Badlands National Park is a PSD Class II area.

unless the source is so designated by federal rule (40 CFR 52.21). As a result, the surface coal mines in the PRB have not been subject to permitting under the PSD regulations because the mine emissions that are subject to PSD applicability levels fall below these thresholds.

### F-2.4 Best Available Control Technology

All sources being permitted within Wyoming must meet state-specific best available control technology (BACT) requirements, regardless of whether the source is subject to state/federal PSD review. During new source review, a BACT analysis is developed for the proposed project. The BACT analysis must evaluate all control options on the basis of technical, economic and environmental feasibility. BACT for mining operations in the PRB is largely dictated by categorical control requirements defined in the WAQSR. BACT decisions are mandated through the new source review pre-construction permit.

### F-2.5 New Source Performance Standards

The new source performance standards (NSPS) are a program of "end-of-stack" technology-based controls/ approaches required by the CAA and adopted by reference into the WAQSR. These standards, which apply to specific types of new, modified or re-constructed stationary sources, require the sources to achieve some base level of emissions control. For surface coal mining in the PRB, this includes certain activities at coal preparation plants. Specifically, the applicable requirements can be found at 40 CFR Part 60, Subpart Y (Standards of Performance for Coal Preparation Plants), and in the WAQSR. However, in Wyoming these standards are typically less stringent than state-level BACT limits.

### F-2.6 Federal Operating Permit Program

The CAAA required the establishment of a facility-wide permitting program for larger sources of pollution. This program, known as the Federal Operating Permit Program, or "Title V" (codified at Title V of the 1990 CAAA), requires that "major sources" of air pollutants obtain a federal operating permit. Under this program, a "major source" is a facility that has the potential to emit more than 100 tons per year (tpy) of any regulated pollutant, 10 tpy of any single hazardous air pollutant (HAP), or 25 tpy or more of any combination of HAPs, from applicable sources. The operating permit is a compilation of all applicable air quality requirements for a facility and requires an ongoing demonstration of compliance through testing, monitoring, reporting and recordkeeping requirements. The potential to emit (PTE) for $PM_{10}$ under the existing air quality permits for the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines were well below the 100 tpy applicability threshold.

## F-2.7 Summary of Pre-Construction Permitting Procedures

The WDEQ/AQD administers a permitting program to assist the agency in managing the state's air resources. Under this program, anyone planning to construct, modify, or use a facility capable of emitting designated pollutants into the atmosphere must obtain an air quality permit to construct. Coal mines fall into this category. A new coal mine, or a modification to an existing mine, must be permitted by WDEQ/AQD, pursuant to the provisions of WAQSR Chapter 6, Section 2. Under these provisions, a successful permittee must demonstrate that it will comply with all applicable aspects of the WAQSR including state and federal ambient air standards.

When a permittee decides to construct a new surface coal mine or modify operations at an existing surface coal mine that will cause an increase in pollutant emissions, they must submit an application, which is reviewed by WDEQ/AQD new source review staff and the applicable WDEQ/AQD field office. Typically, a company will meet with the WDEQ/AQD prior to submitting an application to determine issues and details that need to be included in the application. A surface coal mining application will include the standard application, BACT measures that will be implemented, an inventory of point and fugitive sources for the mine in question as well as neighboring mines and other sources, and air quality modeling analyses addressing cumulative impacts in the mining region.

BACT must be employed at all sources permitted/exempted in Wyoming. Per WAQSR Chapter 6, Section 2, BACT at large mining operations typically include but may not be limited to: paving of access roads, treating of haul routes with chemical dust suppressant (and water) and storage of large amounts of materials/coal awaiting shipment in enclosures such as silos, troughs or barns. These (and other) mitigation measures are considered in the development of emission inventories used for modeling/permitting.

For the modeling analyses, an applicant must compile an emission inventory of $PM_{10}$ from their mining operation, neighboring mines and other surrounding sources. For $PM_{10}$ from the applicant mine, both point source and fugitive dust emissions are quantified. The emissions are based on the facility's potential to emit in each year of the life of mine (LOM). The applicant also examines the surrounding coal mining operations and their previous air quality permits to determine their emissions throughout the LOM. Two or more worst-case years (generally with the highest potential emissions) are then modeled in detail. Other surrounding emission sources, such as power plants, compressor stations, paved highways, long-haul railroad lines and municipalities are also considered in the modeling analysis.

Coal mines in the PRB are also required to quantify nitrogen oxides ($NO_x$) emissions from their operations. Dispersion modeling is required to demonstrate compliance with the ambient $NO_2$ standard. Potential emissions from diesel powered mining equipment, blasting and locomotive emissions (on

mine property) are considered in the modeling analyses. In a fashion similar to the $PM_{10}$ analysis, neighboring mining operations and other surrounding sources are also included in the $NO_x/NO_2$ analysis.

Long-term $PM_{10}$ modeling is conducted for the permit application to demonstrate compliance with the annual $PM_{10}$ standard. For both point and area sources, the Industrial Source Complex Long Term model, version 3 (ISCLT3) is typically used.

The WDEQ/AQD has recently required all mines in the PRB to "submit and justify a background $PM_{10}$ concentration with each permit application" (WDEQ/AQD 2006). A site specific $PM_{10}$ background concentration of 14.91 $\mu g/m^3$ was developed in the modeling analysis for the Black Thunder and Jacobs Ranch mines, while a background concentration of 15.0 $\mu g/m^3$ was developed for the North Antelope Rochelle Mine. The modeling results are added to the background and compared to the annual standard. Likewise, compliance with the annual $NO_2$ standard is verified using ISCLT3 and an $NO_2$ background concentration of 14.0 $\mu g/m^3$ for the Black Thunder and Jacobs Ranch mines and a $NO_2$ background concentration of 20.0 $\mu g/m^3$ for the North Antelope Rochelle Mine.

Short-term $PM_{10}$ modeling is not required by WDEQ/AQD, nor does WDEQ/AQD consider it to be an accurate representation of short-term impacts. Section 234 of the 1990 CAAA mandated the administrator of the EPA to analyze the accuracy of short-term modeling of fugitive particulate emissions from surface coal mines. A June 26, 1996 letter from EPA Region VIII to Wyoming State Representative, Ms. Barbara Cubin, detailed the results of an EPA study wherein the short-term model failed to meet evaluation criteria and tended to significantly overpredict 24-hour impacts of surface coal mines. The memorandum of agreement of January 24, 1994 between EPA Region VIII and the State of Wyoming allows WDEQ/AQD to conduct monitoring in lieu of short-term modeling for assessing coal mining-related impacts in the PRB. This agreement remains in effect and ambient particulate monitoring is required of each coal mine through conditions of their respective permits. The 1994 Memorandum of Agreement also required WDEQ/AQD to implement "Best Available Work Practice" mitigation measures at any mine where an exceedance of the $PM_{10}$ air quality standard has occurred.

The permit application is reviewed by WDEQ/AQD to determine compliance with all applicable air quality standards and regulations. This includes review of compliance with emission limitations established by NSPS, review of compliance with ambient standards through modeling analyses, and establishment of control measures to meet BACT requirements. The WDEQ/AQD proposed permit conditions are sent to public notice for a 30-day review period after which a final decision on the permit is made (or a public hearing is held prior to a final permit decision).

The Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines have prepared permit applications and conducted air quality modeling analyses when mine plan changes have dictated and as required by WDEQ/AQD. These applications and analyses demonstrate that mining operations have complied, and will continue to comply, with all applicable aspects of the WAQSR and the federal CAAA.

In conducting an analysis of air quality impacts in the PRB for the Wyoming and Montana BLM, the Task 1A Report for the Powder River Basin Coal Review reports a background concentration of 5 $\mu g/m^3$ for $NO_x$ for the entire PRB. The air permit actions for the Black Thunder and Jacobs Ranch mines used a background concentration of 14.0 $\mu g/m^3$ for $PM_{10}$ and the North Antelope Rochelle Mine used a background concentration of 20.0 $\mu g/m^3$. These concentrations are based on recently monitored values in Gillette, Wyoming and at the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines, and include all sources operating at the time the value was measured, including existing coal mine operations located around Gillette.

## F-2.8 Natural Events Action Plan

In response to the measured exceedances of the $PM_{10}$ NAAQS in certain areas of the PRB and in anticipation of possible future exceedances, the WDEQ/AQD has collaborated with the Wyoming Mining Association (WMA) to develop a Natural Events Action Plan (NEAP) for the coal mines of the PRB, based on EPA Natural Event Policy guidance. The plan was submitted to and approved by EPA. A report describing the plan can be accessed on the WDEQ/AQD's website at http://deq.state.wy.us/AQD/NEAP%20Files/1-23-07NEAP.pdf.

The NEAP recognizes that certain NAAQS exceedances due to natural events are uncontrollable. While all practical mitigation measures need to be implemented during those events, the exceedances should not be considered against the NAAQS attainment designation for the region. Specific NEAP goals include:

- Provide for the protection of public health,
- Develop public information program,
- Provide a mechanism for "flagging" exceedances due to uncontrollable natural events,
- Implement Best Available Control Measures (BACM) and Reactionary Control Measures (RACM) based on the severity of the event, and
- Provide mechanism for excluding flagged data when they meet specific wind speed criteria and BACM and RACM are in place.

The NEAP identifies, in addition to the BACT measures generally included in individual mine air quality permits, two other categories of control measures designed to prevent exceedances during high wind events (WDEQ/AQD 2007). One of these is an additional list of control measures that the mines can implement continuously so that they are in place before a high wind event

occurs. These measures are not current requirements in all of the mines' air quality permits. They primarily address the principal mine-controlled sources of fugitive dust, which are large contiguous disturbed areas. These measures include:

1. Stabilizing topsoiled area as soon as practicable following topsoil replacement.
2. Ripping, windrowing, mulching, temporarily seeding or chemically treating areas greater than 300 contiguous acres in size that have been stripped of topsoil but will not be mined in the near future.
3. Ripping, windrowing, temporarily seeding or chemically treating graded backfill areas greater than 300 contiguous acres in size.
4. Ripping, mulching, temporarily seeding or chemically treating long-term out-of-pit overburden and topsoil stockpiles that have been graded.
5. Applying non-vegetative barriers such as gravel or other large-diameter particles to erodible surfaces to reduce surface erosion where appropriate.
6. Cleaning, treating, and maintaining pads in front of truck dumps to prevent accumulations of spilled materials from getting pulverized.
7. Scheduling topsoil removal, backfill grading and topsoil replacements concurrently to minimize open areas when possible.
8. Requiring contractors to apply water and/or chemical dust suppressants in their haulage areas.

The second additional category of control measures discussed in the NEAP includes measures that are not currently required by all individual air quality permits but are actions that can be taken during a high wind event, depending on site specific conditions (WDEQ/AQD 2007). These include:

1. The mine operator will consider relevant information, including National Weather Service forecasts and local meteorological information, to confirm that a high wind event is occurring.
2. The mine operator will visually determine areas of mining activity that are generating excessive visible dust and direct water trucks to those areas.
3. The mine operator should direct overburden operations to the shortest haul distance available during a high wind event.
4. The mine operator will evaluate the practicality of dumping the overburden as low as possible.
5. Mine employees will inspect for and extinguish coal fires.
6. The mine operator will evaluate shutting down scoria crushing operations that appear to be generating excess dust.
7. The mine operator will evaluate shutting down road maintenance activities that are generating dust.
8. The mine operator will evaluate ordering contractors to increase water, reduce operating equipment or shut down haulage.
9. The mine operator will evaluate the need to shut down and/or reduce earthmoving activities as the mine schedule and conditions will allow.

If a NEAP is designed and implemented to minimize $PM_{10}$ concentrations, EPA will exercise its discretion, under Section 107(d)(3) of the CAA, not to redesignate areas as nonattainment, provided that the exeedances are demonstrated to be the result of natural events. Based on the EPA's Natural Events Policy, $PM_{10}$ concentrations due to dust raised by unusually high winds will be treated as uncontrollable natural events under the following conditions: (1) the dust originated from non-anthropogenic sources, or (2) the dust originated from anthropogenic sources controlled with the required BACMs.

The WDEQ/AQD NEAP includes a public education plan, a public notification and health advisory program, and a plan to abate or minimize appropriate contributing controllable sources of $PM_{10}$, which includes three categories of control measures. The NEAP approved by EPA only includes measures for control of coal mine sources since it is the ambient monitoring systems around the large surface coal mines that have recorded the exceedances of the 24-hour $PM_{10}$ NAAQS. If it is demonstrated that there are non-coal sources contributing to elevated measurements in an area of concern, WDEQ/AQD may address these additional sources separately from the approved NEAP or as a future update of the plan.

## F-3.0 EXISTING AIR QUALITY

WDEQ monitors air quality through an extensive network of air quality monitors throughout the state. Particulate matter is generally measured as $PM_{10}$. The eastern portion of the PRB has an extensive network of $PM_{10}$ monitors operated by the mining industry due to the density of coal mines in the region (Figure F-2). There are also monitors in Sheridan, Gillette, Arvada and Wright, Wyoming.

This network is sited to measure ambient air quality and to infer impacts from specific sources. Source-specific monitors may also be used for developing trends in $PM_{10}$ concentrations. WDEQ uses data from this monitoring network to identify potential air quality problems and to anticipate issues related to air quality. With this information, the WDEQ can stop or reverse trends that negatively affect the ambient air. Part of that effort has resulted in the formation of a coalition involving the counties, coal companies and coal bed methane operators to focus on minimizing dust from roads. The WDEQ may also take enforcement action to remedy a situation where monitoring shows a violation of any standard. If a monitored standard is exceeded at a specific source, the state agency may initiate enforcement against that source. In those instances, the state agency may use a negotiated settlement agreement to seek corrective action.

WDEQ operates two visibility monitoring stations in the PRB, both of which are IMPROVE sites. One of these sites is located north of Gillette. This site includes a nephelometer, a transmissometer, an aerosol monitor (IMPROVE protocol), and meteorological instruments to measure wind speed, direction, temperature, and relative humidity. The site is also equipped with a digital

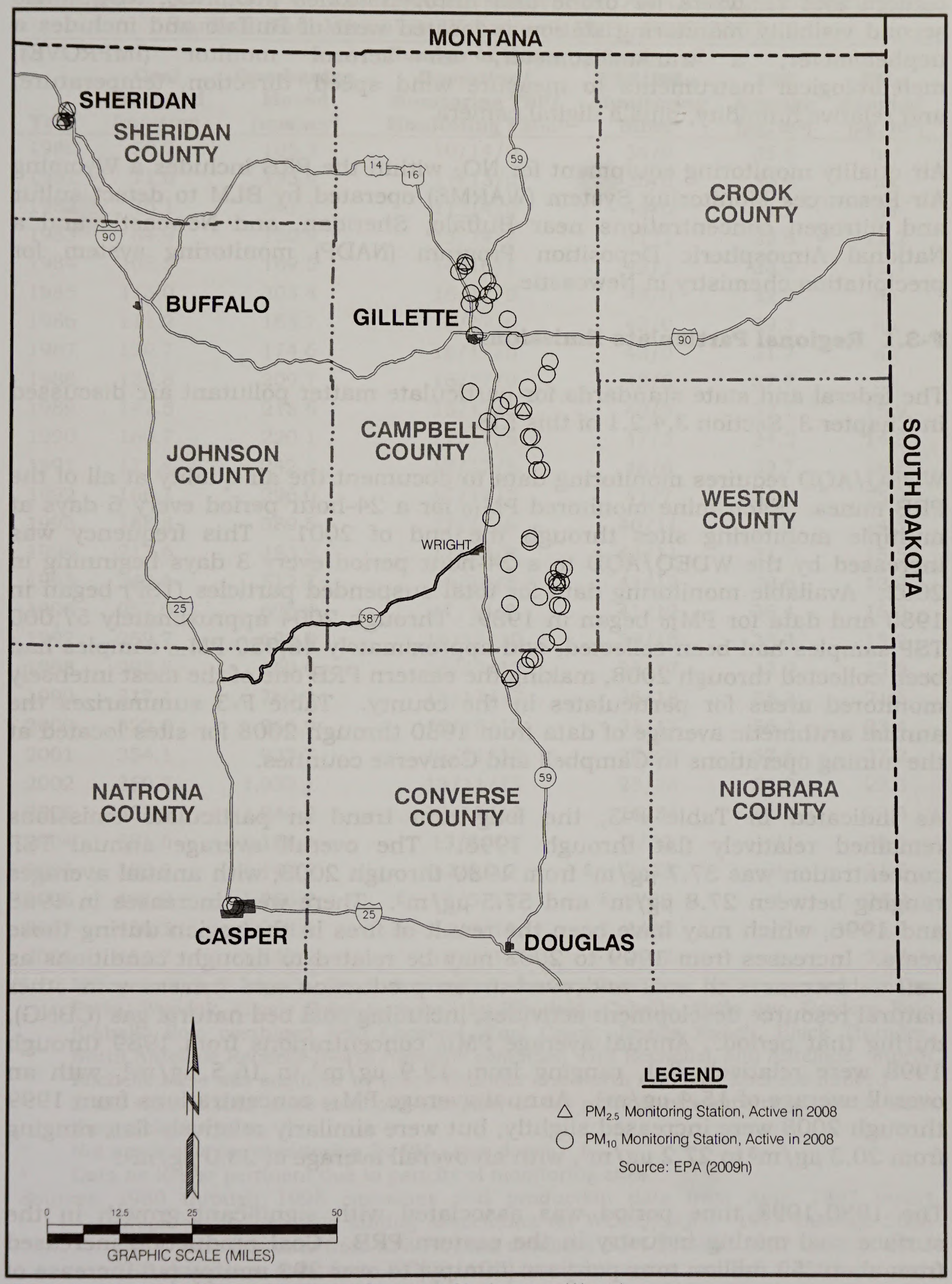


Figure F-2. Active Particulate Monitoring Stations in Northeastern Wyoming.

camera and analyzers for ozone and nitrogen oxides (NO, $NO_2$, $NO_x$). The second visibility monitoring station is located west of Buffalo and includes a nephelometer, a transmissometer, an aerosol monitor (IMPROVE), meteorological instruments to measure wind speed, direction, temperature, and relative humidity, plus a digital camera.

Air quality monitoring equipment for $NO_2$ within the PRB includes a Wyoming Air Resources Monitoring System (WARMS) operated by BLM to detect sulfur and nitrogen concentrations near Buffalo, Sheridan, and Newcastle and a National Atmospheric Deposition Program (NADP) monitoring system for precipitation chemistry in Newcastle.

## F-3.1 Regional Particulate Emissions

The federal and state standards for particulate matter pollutant are discussed in Chapter 3, Section 3.4.2.1 of this EIS.

WDEQ/AQD requires monitoring data to document the air quality at all of the PRB mines. Each mine monitored $PM_{10}$ for a 24-hour period every 6 days at multiple monitoring sites through the end of 2001. This frequency was increased by the WDEQ/AQD to a 24-hour period every 3 days beginning in 2002. Available monitoring data for total suspended particles (TSP) began in 1980 and data for $PM_{10}$ began in 1989. Through 2004 approximately 57,000 TSP samples had been collected, and approximately 48,950 $PM_{10}$ samples had been collected through 2008, making the eastern PRB one of the most intensely monitored areas for particulates in the county. Table F-3 summarizes the annual arithmetic average of data from 1980 through 2008 for sites located at the mining operations in Campbell and Converse counties.

As indicated in Table F-3, the long-term trend in particulate emissions remained relatively flat through 1998. The overall average annual TSP concentration was 37.7 $\mu g/m^3$ from 1980 through 2003, with annual averages ranging between 27.8 $\mu g/m^3$ and 57.5 $\mu g/m^3$. There were increases in 1988 and 1996, which may have been the result of fires in the region during those years. Increases from 1999 to 2003 may be related to drought conditions as well as increases in coal and overburden production and increases in other natural resource development activities, including coal bed natural gas (CBNG), during that period. Annual average $PM_{10}$ concentrations from 1989 through 1998 were relatively flat, ranging from 12.9 $\mu g/m^3$ to 16.5 $\mu g/m^3$, with an overall average of 15.4 $\mu g/m^3$. Annual average $PM_{10}$ concentrations from 1999 through 2008 were increased slightly, but were similarly relatively flat, ranging from 20.3 $\mu g/m^3$ to 27.2 $\mu g/m^3$, with an overall average of 23.0 $\mu g/m^3$.

The 1980-1998 time period was associated with significant growth in the surface coal mining industry in the eastern PRB. Coal production increased from about 59 million tons per year (mmtpy) to over 293 mmtpy (an increase of almost 400 percent), and associated overburden production increased from 105 million bank cubic yards (mmbcy) to 669 mmbcy per year (an increase of over

Table F-3. Summary of WDEQ/AQD Reports on Air Quality Monitoring for Surface Coal Mines[1] in Wyoming's PRB, 1980-2007.

| Year | Coal Produced (mmtpy) | Overburden Moved (mmbcy) | Number of Mines Operating/ Monitoring TSP/ Monitoring $PM_{10}$[1] | Number of TSP/$PM_{10}$ Monitoring Sites[2] | TSP Average ($\mu g/m^3$) | $PM_{10}$ Average ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| 1980 | 58.7 | 105.3 | 10/14/0 | 34/0 | 35.5 | na[3] |
| 1981 | 71.0 | 133.4 | 11/13/0 | 35/0 | 39.4 | na |
| 1982 | 76.1 | 141.1 | 11/14/0 | 40/0 | 31.2 | na |
| 1983 | 84.9 | 150.9 | 13/14/1 | 41/1 | 32.6 | 11.2 |
| 1984 | 105.3 | 169.5 | 14/16/1 | 42/1 | 33.9 | 11.1 |
| 1985 | 113.0 | 203.4 | 16/17/0 | 49/0 | 32.3 | na |
| 1986 | 111.2 | 165.7 | 16/17/0 | 45/0 | 29.3 | na |
| 1987 | 120.7 | 174.6 | 16/17/0 | 43/0 | 31.7 | na |
| 1988 | 138.8 | 209.7 | 16/17/0 | 43/0 | 37.7 | na |
| 1989 | 147.5 | 215.6 | 15/17/3 | 40/3 | 32.1 | 15.9 |
| 1990 | 160.7 | 220.1 | 17/17/5 | 47/5 | 34.3 | 14.8 |
| 1991 | 171.4 | 242.3 | 17/17/5 | 46/6 | 32.7 | 16.5 |
| 1992 | 166.1 | 296.0 | 17/17/7 | 41/7 | 31.7 | 15.9 |
| 1993 | 188.8 | 389.5 | 17/17/8 | 40/11 | 27.8 | 14.5 |
| 1994 | 213.6 | 483.9 | 17/18/8 | 44/11 | 31.7 | 15.5 |
| 1995 | 242.6 | 512.7 | 16/18/8 | 41/12 | 29.6 | 12.9 |
| 1996 | 257.0 | 605.4 | 17/18/8 | 41/12 | 35.4 | 16.0 |
| 1997 | 259.7 | 622.0 | 16/17/10 | 39/15 | 33.3 | 15.9 |
| 1998 | 293.5 | 669.0 | 16/17/12 | 36/17 | 33.9 | 15.9 |
| 1999 | 317.1 | 762.9 | 15/17/12 | 36/18 | 55.3 | 21.6 |
| 2000 | 322.6 | 868.9 | 15/15/12 | 31/17 | 56.1 | 23.4 |
| 2001 | 354.1 | 927.7 | 12/11/12 | 29/29 | 57.5 | 27.2 |
| 2002 | 359.7 | 1,032.1 | 13/11/13 | 23/38 | 56.0 | 23.3 |
| 2003 | 363.6 | 1,044.2 | 13/10/13 | 16/34 | 51.9 | 20.8 |
| 2004 | 381.6 | 1,184.4 | 13/6/13 | 7/33 | --[4] | 20.3 |
| 2005 | 390.3 | 1,147.6 | 12/6/12 | 7/33 | --[4] | 21.5 |
| 2006 | 431.9 | 1,256.7 | 13/5/13 | 6/33 | --[4] | 24.2 |
| 2007 | 436.5 | 1,268.5 | 14/4/14 | 4/33 | --[4] | 25.2 |
| 2008 | 451.7 | 1,432.2 | 13/0/13 | 0/37 | --[4] | 22.8 |

1 Mines include Buckskin, Rawhide, Eagle Butte, Dry Fork, Fort Union (acquired by Dry Fork), Wyodak, Clovis Point (acquired by Wyodak), Caballo, Belle Ayr, Cordero Rojo (Caballo Rojo combined with Cordero), Coal Creek, Jacobs Ranch, Black Thunder, North Antelope Rochelle (North Antelope combined with Rochelle), and Antelope. (North Rochelle Mine was acquired by Black Thunder and North Antelope Rochelle mines.)

2 Some sites include more than one sampler, so the number of samplers is greater than the number of sites.

3 Not applicable (no monitoring for $PM_{10}$ was done).

4 Data no longer pertinent due to paucity of monitoring sites.

Sources: 1980 through 1996 emissions and production data from April 1997 report prepared by Wyoming Mining Association for WDEQ/AQD. 1997 through 2008 $PM_{10}$ emissions data from EPA AirData database (EPA 2009a). 1997 through 2003 TSP emissions data from WDEQ/AQD (available upon request). 1997 through 2008 production data from WDEQ/AQD (Shamley 2008a, 2010) and Wyoming Department of Employment/State Inspector of Mines (1997-2007a, 2008c).

537 percent). From 1990 through 2007, the average annual increase in coal production was 6.3 percent, while annual overburden production increased an average of 11.3 percent over the same time period. The proportionately larger annual increase in overburden production is due to the fact that the mines are gradually moving into areas of higher stripping ratios as the shallower reserves are mined out.

The relatively flat trend in particulate emissions from 1980 through 1998 is due in large part to the Wyoming Air Quality Program that requires BACT at all permitted facilities. BACT control measures, which include watering and chemical treatment of roads, limiting the amount of area disturbed, temporary revegetation of disturbed areas to reduce wind erosion, and timely final reclamation, are discussed in Section 3.4.2.3 of this EIS.

The average annual TSP concentration increased from 33.9 $\mu g/m^3$ in 1998 to 55.3 $\mu g/m^3$ in 1999, and remained greater than 50.0 $\mu g/m^3$ through 2003. The average annual $PM_{10}$ concentration increased from 15.9 $\mu g/m^3$ in 1998 to 21.6 $\mu g/m^3$ in 1999 and peaked in 2001 at 27.2 $\mu g/m^3$. The monitored concentrations have decreased since 2001; in 2004, the average annual concentration was 20.3 $\mu g/ m^3$ and in 2008 it was 22.8 $\mu g/ m^3$. The average annual increase in coal production from 2001 through 2008 (3.4 percent per year, or 12.2 mmtpy over the 8-year period) and associated overburden production (6.8 percent per year and 63.1 mmbcy over the 8-year period) were less than a majority of the previous twenty 5-year running average periods, but the particulate concentrations remained relatively constant. There were no major fires in the region between 1998 and 2005 but major fires were experienced in the region in 2006 and 2007. There was an increase in CBNG development in the PRB between 1998 and 2005 and northeastern Wyoming has experienced extreme drought conditions as well as a dramatic increase in surface disturbance activities associated with CBNG development since 1999. All of these factors have exacerbated particulate emissions.

There were no monitored exceedances of the 24-hour $PM_{10}$ standards anywhere in the Wyoming PRB through year 2000. From 2001 through 2006 there were 29 monitored exceedances of the 24-hour $PM_{10}$ standard at seven operating mines, and in 2007 a total of 11 exceedances were reported at six mines. A majority of the 29 exceedances reported between 2001 and 2006 were associated with elevated winds exceeding 20 miles per hour, each of which could have qualified as a high wind event under the NEAP. Of the 11 exceedances reported within the PRB in 2007, nine have been flagged as exceptional events by EPA under the NEAP and will be treated as uncontrollable natural events (not considered when determining the region's air quality designation). Of the two other reported exceedances in 2007, one is still under review by EPA and may be flagged as an exceptional event under the NEAP, and one was determined by EPA to be a valid exceedance (not considered an exceptional event under the NEAP) and a notice of violation was subsequently issued (Shamley 2010). In 2008, a total of two exceedances of the 24-hour $PM_{10}$ standard were reported in the PRB, one each at the Black

Thunder Mine and North Rochelle Mine. WDEQ/AQD subsequently issued notices of violation for both exceedances that occurred in 2008 (Shamley 2010). There were no exceedances of the 24-hour $PM_{10}$ particulate standard reported in the PRB in 2009 (Shamley 2010). In summary, 29 of the 33 valid exceedances (those not considered exceptional events under the NEAP) of the 24-hour $PM_{10}$ standard that have occurred in the PRB through 2009 have been recorded by the group of mines located south and east of the town of Wright; the remaining four valid exceedances occurred in the group of mines located north of Gillette (Figure F-1).

Emissions control measures that are used to control particulate emissions at the PRB mines, including the three applicant mines in the Wright area (Black Thunder, Jacobs Ranch and North Antelope Rochelle), are discussed in Chapter 3, Section 3.4.2.3 of this EIS.

County roads are also responsible for some portion of the fugitive dust related to transportation. To help address this problem, the Campbell County Commissioners, oil and gas production companies, and coal mine operators have formed a coalition to implement the most effective dust control measures on a number of county roads. Measures taken have ranged from the implementation of speed limits to paving of heavily traveled roads. The coalition has utilized chemical treatments to control dust as well as closing roads where appropriate or necessary and rebuilding existing roads to higher specifications. The coalition requested money from the Wyoming State Legislature to fund acquisition of Rotomill (ground up asphalt) to be mixed with gravel for use in treating some of the roads in the PRB. The Rotomill/gravel mixture has been demonstrated to be effective in reducing dust; the life of the mixture on treated roads is estimated to be from 5 to 6 years (Bott 2006).

## F-3.2 Regional $NO_2$ Concentrations

The federal and state standards for $NO_2$ are discussed in Chapter 3, Section 3.4.3.1 of this EIS.

Nitrogen oxides ($NO_x$) form when fuel is burned at high temperatures. They can be formed naturally or by human activities. The primary manmade sources are motor vehicles, electric utilities, and other fuel-burning sources. According to the EPA, motor vehicles produce about 55 percent of the manmade $NO_x$ emissions, utilities and industrial/commercial/residential activities each produce about 22 percent of the manmade $NO_x$ emissions, and other sources account for the remaining 1 percent of the manmade emissions (EPA 2009b). The primary direct source of emissions of $NO_x$ during coal mining operations is tailpipe emissions from large mining equipment and other vehicle traffic inside the mine permit area.

Blasting that is done to remove the material overlying the coal (the overburden) can result in emissions of several products, including $NO_2$, as a result of the incomplete combustion of nitrogen-based explosives used in the blasting

process. When this occurs, gaseous, orange-colored clouds may be formed and they can drift or be blown off mine permit areas.

$NO_2$ is a product of incomplete combustion of sources such as gasoline- and diesel-burning engines or from mine blasting activities. Incomplete combustion during blasting may be caused by wet conditions in the overburden, incompetent or fractured geological formations, deformation of bore holes, and blasting agent factors. Generally, blasting-related $NO_x$ emissions are more prevalent at operations that use the blasting technique referred to as cast blasting (Chancellor 2003). Cast blasting refers to a type of direct blasting in which the blast is designed to cast the overburden from on top of the coal into the previously mined area.

In the mid-to late-1990s, the Office of Surface Mining Reclamation and Enforcement (OSM) received complaints from several citizens about blasting clouds from several mines in the PRB. EPA expressed concerns that $NO_2$ levels in some of those blasting clouds may have been sufficiently high at times to cause human health effects. In response to those concerns, several studies have been conducted, the mines have modified their blasting techniques, and the WDEQ has imposed blasting restrictions on several mines. More information about these studies and restrictions is presented in the following discussion.

On the order of the Director of the WDEQ, members of the mining industry in the PRB conducted a comprehensive, multi-year monitoring and modeling study of $NO_2$ exposures from blast clouds. Results of the study (TBCC 2002), conducted pursuant to protocols reviewed and approved by the WDEQ, were provided to the WDEQ and the public in July 2002.

Using a combination of $NO_2$ measurements collected near 91 blast sites (78 valid runs) and a conservative modeling/extrapolation approach, the authors developed a series of "safe" setback curves for coal, overburden and cast shots for various wind speed classes. The curves were derived from the sampled data, conservative projections of concentrations at greater/lesser distances than measured and an assumed safe level (based on a comprehensive review of available health effects data) of 5.0 ppm for 10 minutes.

Subsequently, the data in the 2002 report (collected at the Black Thunder Mine) were augmented with monitored data/analyses from an additional 45 validated blast events at the Eagle Butte, North Antelope Rochelle, Buckskin and Cordero Rojo mines. New curves, based on the entire basin-wide data set encompassing 123 valid tests, were developed but differed only slightly from the original Black Thunder curves.

Measures that are used by the mines to control $NO_2$ emissions related to blasting by the PRB mines are discussed in Chapter 3, Section 3.4.3.3 of the EIS.

## F-4.0 REFERENCES CITED

All references cited within this appendix are included within Section 6.0 of this EIS.

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# APPENDIX G

BIOLOGICAL ASSESSMENT
FOR THE WRIGHT AREA COAL
LEASE APPLICATIONS EIS

NORTH HILIGHT FIELD LBA TRACT
SOUTH HILIGHT FIELD LBA TRACT
WEST HILIGHT FIELD LBA TRACT
WEST JACOBS RANCH LBA TRACT
NORTH PORCUPINE LBA TRACT
SOUTH PORCUPINE LBA TRACT

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## G-1.0 INTRODUCTION

This Biological Assessment (BA) discusses the potential effects of leasing six tracts of federal coal reserves located adjacent to operating surface coal mines in the southern Powder River Basin (PRB) of Wyoming on threatened, endangered, and proposed species pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (PL 93-205, as amended). The environmental impacts of leasing all six lease by application (LBA) tracts are being evaluated in this environmental impact statement (EIS), the Wright Area Coal (WAC) Lease Applications EIS. For federal actions that are major construction activities, the ESA requires that a BA be prepared to evaluate the potential effects of the action on federally listed threatened and endangered (T&E) and proposed species and designated and proposed critical habitat that may be present in the action area, consistent with regulations at 50 CFR 402.12. This BA was prepared under the direction of the Bureau of Land Management (BLM) and the U.S. Department of Agriculture-Forest Service (USFS) (a cooperating agency on this EIS). USFS has established direction to guide habitat management for T&E species in Forest Service Manual 2670.

The objectives of this BA are:

1. To comply with the provisions of the ESA, which requires federal agencies to use their authorities to carry out programs to conserve T&E species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, nor result in the destruction or adverse modification of their critical habitats.

2. To provide a process and standard by which to ensure that T&E species receive full consideration in the decision making process.

### G-1.1 Background

Between October 2005 and September 2006, operators of three existing coal mines in Campbell County, Wyoming filed applications with the BLM for federal coal reserves in six separate tracts as maintenance leases under the Leasing on Application regulations at 43 CFD 3425. The six LBA tracts, which are shown on Figure G-1, and the respective applicant mines are:

- North Hilight Field LBA Tract adjacent to the Black Thunder Mine;
- South Hilight Field LBA Tract adjacent to the Black Thunder Mine;
- West Hilight Field LBA Tract west of the Black Thunder Mine;
- West Jacobs Ranch LBA Tract west of the Jacobs Ranch Mine;
- North Porcupine LBA Tract adjacent to the North Antelope Rochelle Mine; and
- South Porcupine LBA Tract adjacent to the North Antelope Rochelle Mine.

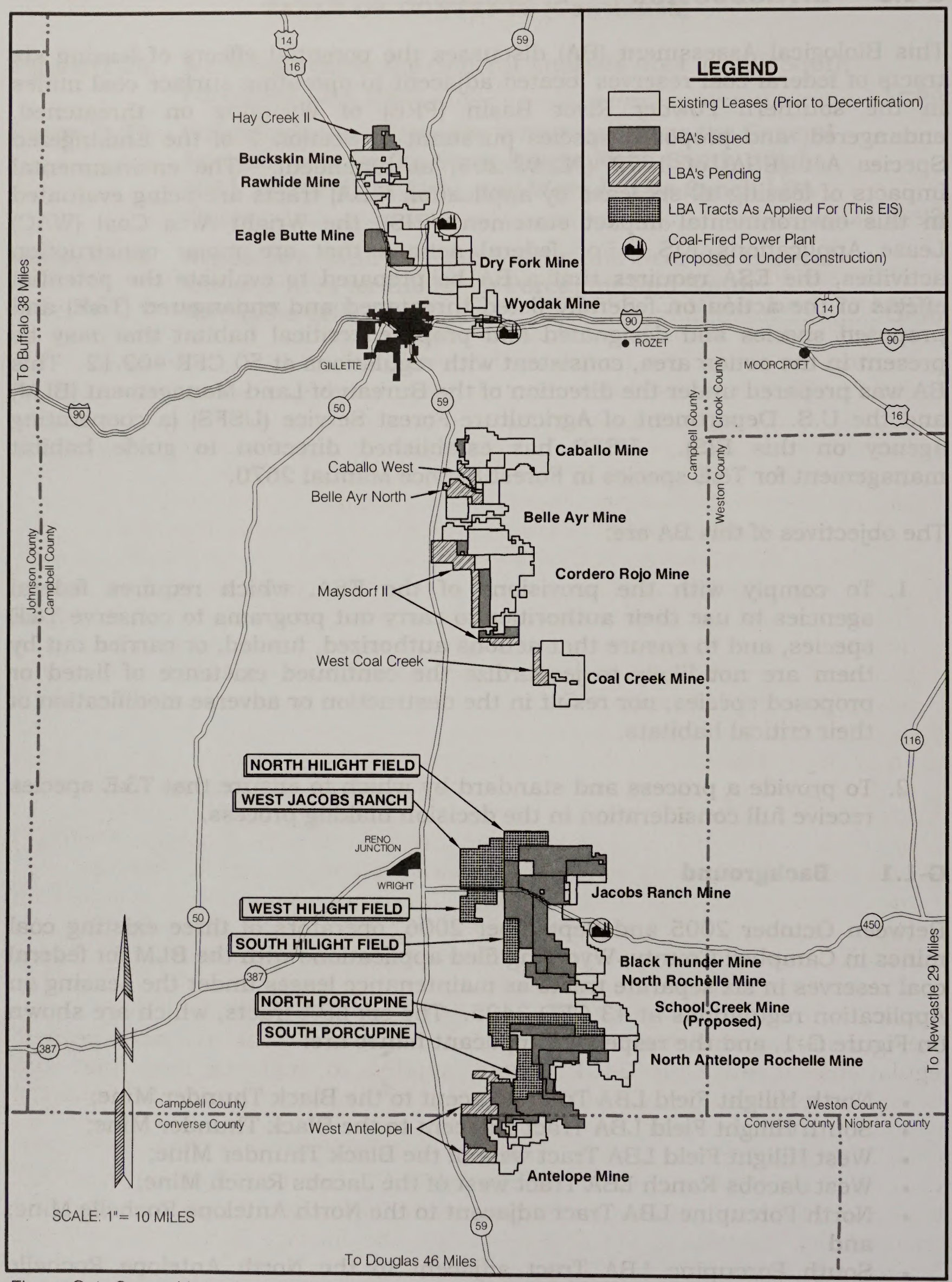


Figure G-1. General Location Map with Federal Coal Leases and LBA Tracts.

If a decision is made to hold separate competitive lease sales for the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, or South Porcupine LBA Tracts, and if there is a successful bidder at a sale, a lease would be issued for the tract of federal coal that is offered for sale. The tracts offered for lease would be subject to standard and special lease stipulations developed for the Wyoming PRB. The stipulations that would be attached to a lease for each of the six WAC LBA tracts are listed in Appendix D of this EIS. The following stipulation relating to T&E species is one of the special stipulations developed for the Wyoming PRB:

> ***THREATENED, ENDANGERED, CANDIDATE, or OTHER SPECIAL STATUS PLANT and ANIMAL SPECIES*** *– The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq., or that have other special status. The Authorized Officer may recommend modifications to exploration and development proposals to further conservation and management objectives or to avoid activity that will contribute to a need to list such species or their habitat or to comply with any biological opinion issued by the Fish and Wildlife Service for the Proposed Action. The Authorized Officer will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act. The Authorized Officer may require modifications to, or disapprove a proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species, or result in the destruction or adverse modification of designated or proposed critical habitat.*
>
> *The lessee shall comply with instructions from the Authorized Officer of the surface managing agency (BLM, if the surface is private) for ground disturbing activities associated with coal exploration on federal coal leases prior to approval of a mining and reclamation permit or outside an approved mining and reclamation permit area. The lessee shall comply with instructions from the Authorized Officer of the Office of Surface Mining Reclamation and Enforcement, or his designated representative, for all ground disturbing activities taking place within an approved mining and reclamation permit area or associated with such a permit.*

The coal mining unsuitability criteria listed in the federal coal management regulations at 43 CFR 3461.5 were applied to high to moderate coal development potential lands in the Wyoming PRB. As indicated in Sections 1.1 and 1.5 of this EIS, some of the coal in the six tracts is overlain by rights-of-way (ROWs) for a state highway or county roads, or portions of the Burlington Northern Santa Fe and Union Pacific (BNSF & UP) Railroad ROW and has been determined to be unsuitable for mining under Unsuitability Criterion 2 and/or Unsuitability Criterion 3 (43 CFR 3461.5). The Surface Mining Control and Reclamation Act of 1977 (SMCRA) prohibits surface mining operations on lands within 100 feet of the outside line of the ROW for a public road (SMCRA Section 522(e)(4) and 30 CFR 761.11(d)). There is an exception to this prohibition in

the regulations at SMCRA Section 522(e)(4) and 30 CFR 761.11(d)(2), which can be applied if the appropriate road authority (Wyoming Department of Transportation for state highways and Campbell County Board of Commissioners for county roads) allows a public road to be relocated or closed after public notice, an opportunity for a public hearing, and a finding that the interests of the affected public and landowners will be protected. Although the federal coal underlying the railroad and road ROWs and associated buffer zones may not be mined, it is included in a tract because it would allow maximum recovery of the mineable coal adjacent to but outside of the railroad and road ROWs and associated buffer zones and comply with the coal leasing regulations that do not allow leasing of less than 10-acre aliquot parts.

BLM does not authorize mining by issuing a lease for federal coal, but the impacts of mining the coal are considered at the leasing stage because they are a logical consequence of issuing a lease.

For each tract, the Proposed Action is to hold a separate competitive lease sale and issue a separate lease for the federal coal lands included in the tract as applied for by the applicant. The boundaries of each tract would be consistent with the tract configuration proposed by each applicant. The Proposed Action assumes that each LBA tract would be developed as maintenance lease to extend the life of the adjacent existing applicant mine and that the applicant would be the successful bidder on the tract. As a result, under the Proposed Action, the coal included in the tract would be mined by existing employees using existing facilities and roads.

The BLM Competitive Coal Leasing Manual (BLM Manual 3420-1) requires BLM to evaluate modifying the configuration of federal coal tracts based on providing for maximum economic recovery of the coal resource, maintaining or increasing the potential for competition, and avoiding future bypass or captive tract situations. BLM therefore identifies alternate tract configurations and evaluates them as alternatives to the Proposed Action. BLM has identified a study area for each LBA tract that includes each tract as applied for and adjacent unleased federal coal. BLM is evaluating these study areas for the purpose of identifying potential alternate tract configurations to the Proposed Action that would be technically, economically, or environmentally preferable to the Proposed Action.

It is assumed that an area larger than an LBA tract would have to be disturbed in order to recover all of the coal in the tract. The disturbances outside of a tract would be due to activities like overstripping, matching undisturbed topography, and construction of flood control and sediment control structures. The BLM study area for each of these six LBA tracts is defined as the original tract as applied for, plus all lands that BLM is considering adding to the tract. The general analysis area for each of these six LBA tracts is defined as the BLM study area plus surrounding lands within a ¼-mile perimeter that could be disturbed by mining the coal within the BLM study area where future mining disturbance could occur. The general analysis area for the North Hilight Field

LBA Tract includes some lands within both Black Thunder and Jacobs Ranch Mines' existing mine permit boundaries. The general analysis area for the South Hilight Field LBA Tract includes some lands within Black Thunder Mine's current mine permit area. The general analysis area for the West Hilight Field LBA Tract does not include lands within a current mine permit area. The general analysis area for the West Jacobs Ranch LBA Tract includes some lands within the Black Thunder Mine's current mine permit area. The general analysis areas for both the North and South Porcupine LBA Tracts are almost entirely within North Antelope Rochelle Mine's current mine permit area. The general Wright analysis area is defined as the area encompassing all six of these LBA tract general analysis areas.

## G-1.2 Description of the North Hilight Field Tract Proposed Action and Alternatives

On October 7, 2005, Ark Land Company (ALC) filed an application with the BLM for federal coal reserves in two separate tracts located north and southwest of and immediately adjacent to the Black Thunder Mine in Campbell County, Wyoming (Figure G-1). The tracts, which are referred to as the North Hilight Field and South Hilight Field LBA Tracts, were assigned case file numbers WYW164812 and WYW174596, respectively. The federal coal reserves were applied for as maintenance tracts for the Black Thunder Mine. BLM determined that the two tracts in the application would be processed separately and, if the decision is made to conduct a lease sale, would be offered for sale separately. ALC is a wholly owned subsidiary of Arch Coal, Inc. The Black Thunder Mine is operated by Thunder Basin Coal Company (TBCC), a subsidiary of Arch Western Resources, LLC. ALC is referred to as the applicant and TBCC is referred to as the mine operator.

### G-1.2.1 Proposed Action

Under the Proposed Action for the North Hilight Field LBA Tract, the tract as applied for by ALC would be offered for lease at a sealed-bid, competitive lease sale, subject to standard and special lease stipulations developed for the PRB (Appendix D of this EIS). The boundaries of the tract would be consistent with the tract configuration proposed in the North Hilight Field lease application (Figure G-2). The Proposed Action assumes that ALC would be the successful bidder on the North Hilight Field LBA Tract if it is offered for sale, and the tract would be mined as a maintenance lease for an existing mine.

The legal description of the proposed North Hilight Field LBA Tract coal lease lands as applied for by ALC under the Proposed Action is as follows:

T.44N., R.70W., 6th PM, Campbell County, Wyoming
Section 19: Lots 5 through 20; 656.88 acres

T.44N., R.71W., 6th PM, Campbell County, Wyoming
Section 23: Lots 1 through 16; 653.11 acres

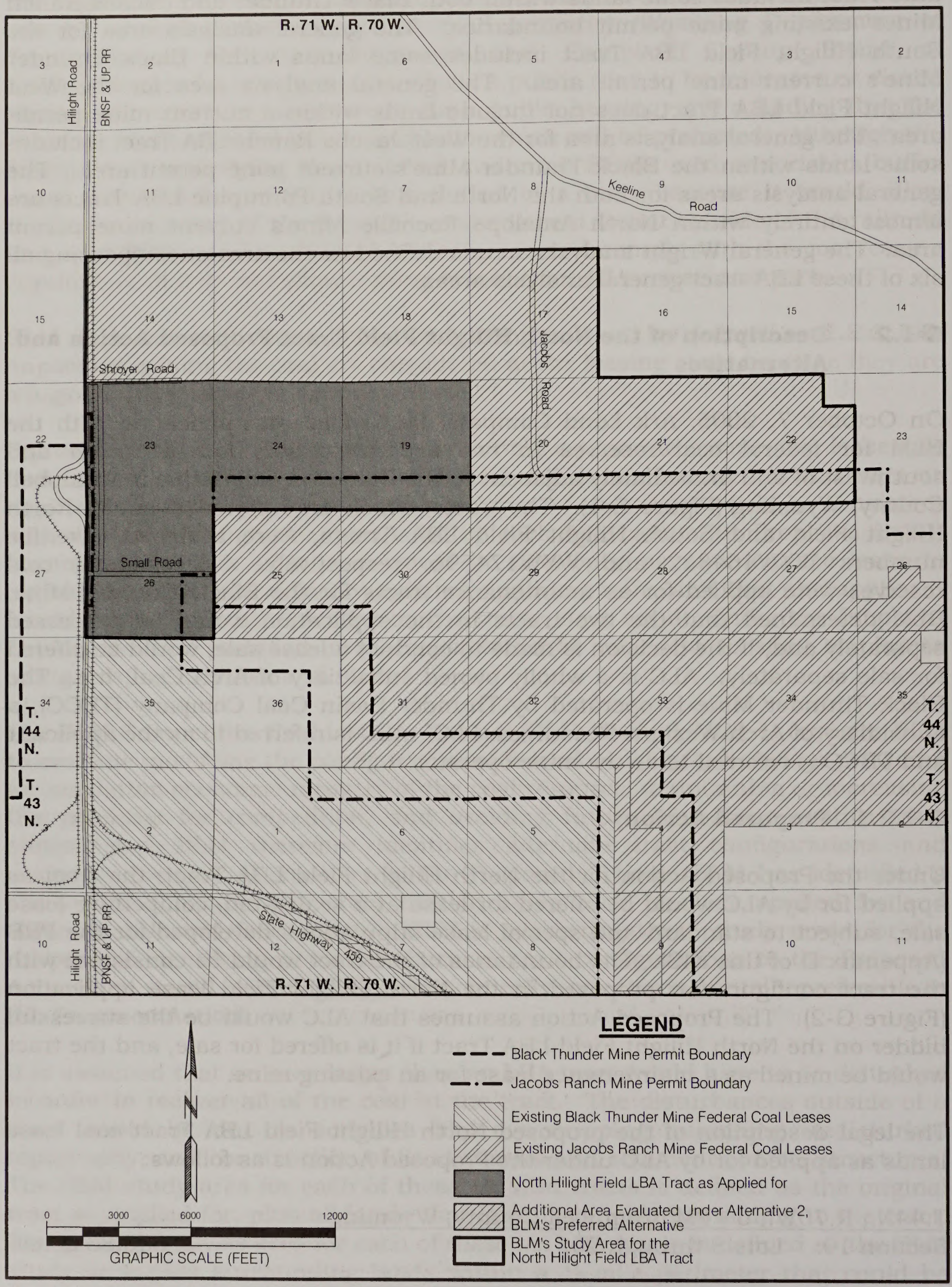


Figure G-2. North Hilight Field LBA Tract Alternatives.

| | | |
|---|---|---|
| Section 24: | Lots 1 through 16; | 653.44 acres |
| Section 26: | Lots 1 through 16; | 650.07 acres |
| Total: | | 2,613.50 acres |

The coal estate included in the tract described above is federally owned and administered by the BLM. The ownership of the surface and oil and gas estates is discussed in Section 3.11 of this EIS. Surface ownership is shown in Figure G-3.

### G-1.2.2 Alternatives to the Proposed Action

#### G-1.2.2.1 Alternative 1

Under Alternative 1, the No Action Alternative, ALC's application to lease the coal included in the North Hilight Field LBA Tract would be rejected. The tract would not be offered for competitive sale at this time, and the coal included in the tract would not be mined. Rejection of the application would not affect permitted mining activities or employment on the existing leases at the Black Thunder Mine. Portions of the surface of the LBA tract would probably be disturbed by both the Black Thunder and Jacobs Ranch mines due to overstripping to allow coal to be removed from existing contiguous leases.

#### G-1.2.2.2 Alternative 2 (BLM's Preferred Alternative)

Under Alternative 2 for the North Hilight Field LBA Tract, BLM would reconfigure the tract, hold one competitive coal sale for the lands included in the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the Powder River Basin (PRB) and for this tract if it is offered for sale (Appendix D of this EIS). Alternative 2, holding a competitive coal sale for a modified tract, is BLM's Preferred Alternative.

Alternative 2 for the North Hilight Field LBA Tract assumes that ALC would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease to extend the life of the adjacent existing Black Thunder Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the North Hilight Field coal lease application, BLM identified a study area that includes unleased federal coal adjacent to the northern and eastern edges of the tract as applied for (Figure G-2). BLM is evaluating the potential that some or all of these lands could be added to the area to be offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the North Hilight Field LBA Tract, and/or reduce the potential that some potentially mineable federal coal in this area would be bypassed if it is not included in the North Hilight Field LBA Tract.

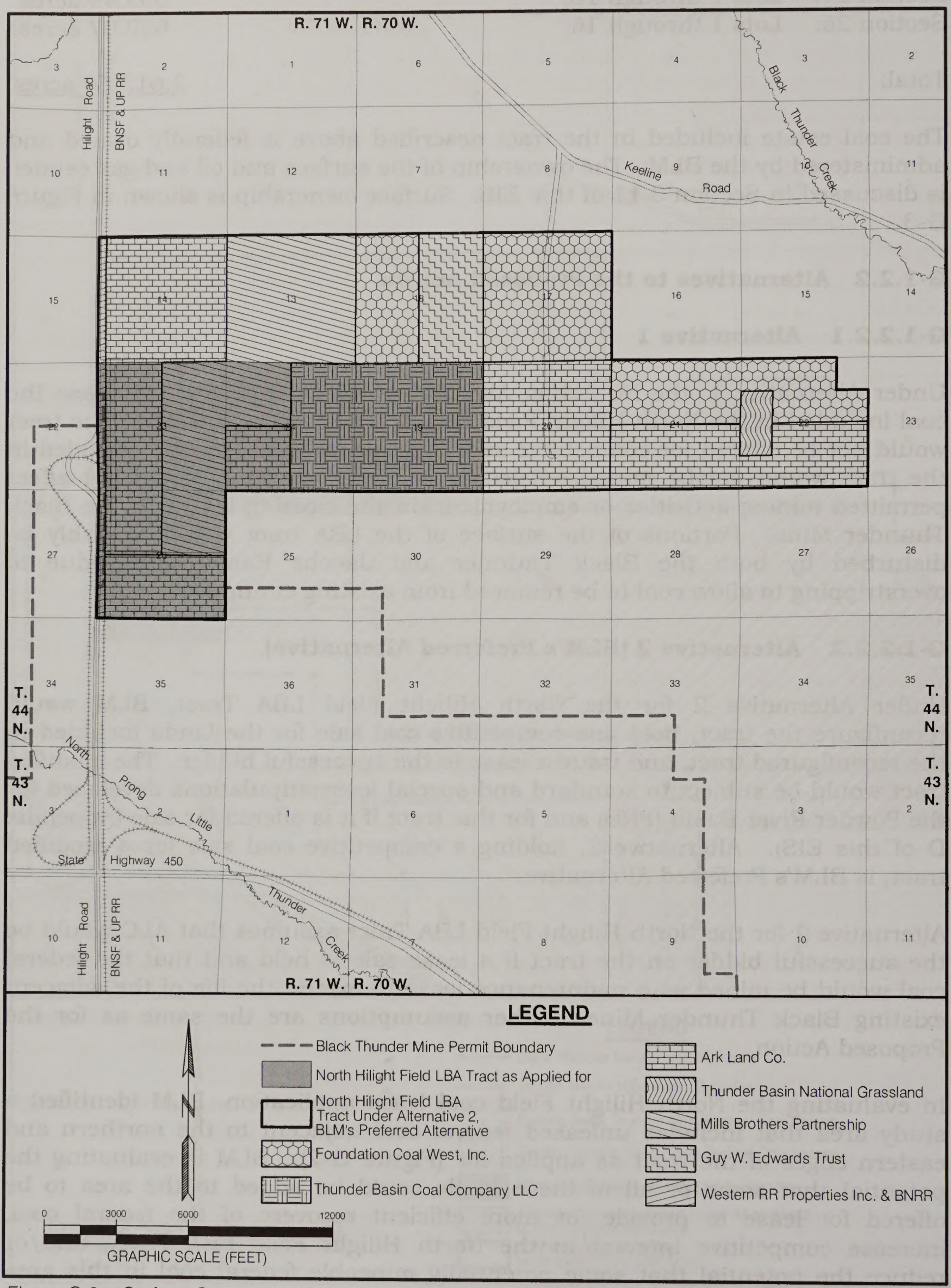


Figure G-3. Surface Ownership Within the North Hilight Field LBA Tract Alternatives.

Under Alternative 2, the area BLM is evaluating adding to the tract as applied for includes the following lands:

| | | |
|---|---|---|
| T.44N., R.70W., 6th PM, Campbell County, Wyoming | | |
| Section 17: | Lots 1 through 16; | 654.17 acres |
| Section 18: | Lots 5 through 20; | 655.14 acres |
| Section 20: | Lots 1 through 16; | 651.07 acres |
| Section 21: | Lots 1 through 16; | 658.37 acres |
| Section 22: | Lots 1 through 15; | 606.85 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 13: | Lots 1 through 16; | 655.53 acres |
| Section 14: | Lots 1 through 16; | 644.74 acres |
| Total: | | 4,525.87 acres |

The legal description of BLM's preferred configuration of the North Hilight Field LBA Tract under Alternative 2 (Figure G-2) is as follows:

| | | |
|---|---|---|
| T.44N., R.70W., 6th PM, Campbell County, Wyoming | | |
| Section 17: | Lots 1 through 16; | 654.17 acres |
| Section 18: | Lots 5 through 20; | 655.14 acres |
| Section 19: | Lots 5 through 20; | 656.88 acres |
| Section 20: | Lots 1 through 16; | 651.07 acres |
| Section 21: | Lots 1 through 16; | 658.37 acres |
| Section 22: | Lots 1 through 15; | 606.85 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 13: | Lots 1 through 16; | 655.53 acres |
| Section 14: | Lots 1 through 16; | 644.74 acres |
| Section 23: | Lots 1 through 16; | 653.11 acres |
| Section 24: | Lots 1 through 16; | 653.44 acres |
| Section 26: | Lots 1 through 16; | 650.07 acres |
| Total: | | 7,139.37 acres |

The BLM study area includes lands (approximately 80.8 acres) on the Thunder Basin National Grassland (TBNG), which is administered by the USFS.

### G-1.3 Description of the South Hilight Field Tract Proposed Action and Alternatives

On October 7, 2005, ALC filed an application with the BLM for federal coal reserves in two separate tracts located north and southwest of and immediately adjacent to the Black Thunder Mine in Campbell County, Wyoming (Figure G-1). The tracts, which are referred to as the North Hilight Field and South Hilight Field LBA Tracts, were assigned case file numbers WYW164812 and WYW174596, respectively. The federal coal reserves were applied for as

maintenance tracts for the Black Thunder Mine. BLM determined that the two tracts in the application would be processed separately and, if the decision is made to conduct a lease sale, would be offered for sale separately.

### G-1.3.1 Proposed Action

Under the Proposed Action for the South Hilight Field LBA Tract, the tract as applied for by ALC would be offered for lease at a sealed-bid, competitive lease sale, subject to standard and special lease stipulations developed for the PRB (Appendix D of this EIS). The boundaries of the tract would be consistent with the tract configuration proposed in the South Hilight Field lease application (Figure G-4). The Proposed Action assumes that ALC would be the successful bidder on the South Hilight Field LBA Tract if it is offered for sale, and the tract would be mined as a maintenance lease for an existing mine.

The legal description of the proposed South Hilight Field LBA Tract coal lease lands as applied for by ALC under the Proposed Action is as follows:

| | | |
|---|---|---|
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 23: | Lots 1 through 16; | 649.36 acres |
| Section 26: | Lots 1 through 16; | 667.69 acres |
| Section 35: | Lots 1 through 16; | 659.64 acres |
| Total: | | 1,976.69 acres |

The coal estate included in the tract described above is federally owned and administered by the BLM. Much of the surface (approximately 83 percent) of the tract as applied for includes lands on the TBNG, which is administered by the USFS. The ownership of the surface and oil and gas estates is discussed in Section 3.11 of this EIS. Surface ownership is shown in Figure G-5.

### G-1.3.2 Alternatives to the Proposed Action

#### G-1.3.2.1 Alternative 1

Under Alternative 1, the No Action Alternative, ALC's application to lease the coal included in the South Hilight Field LBA Tract would be rejected. The tract would not be offered for competitive sale at this time, and the coal included in the tract would not be mined. Rejection of the application would not affect permitted mining activities or employment on the existing leases at the Black Thunder Mine. Portions of the surface of the LBA tract would probably be disturbed by the Black Thunder Mine due to overstripping to allow coal to be removed from existing contiguous leases.

#### G-1.3.2.2 Alternative 2 (BLM's Preferred Alternative)

Under Alternative 2 for the South Hilight Field LBA Tract, BLM would reconfigure the tract, hold one competitive coal sale for the lands included in

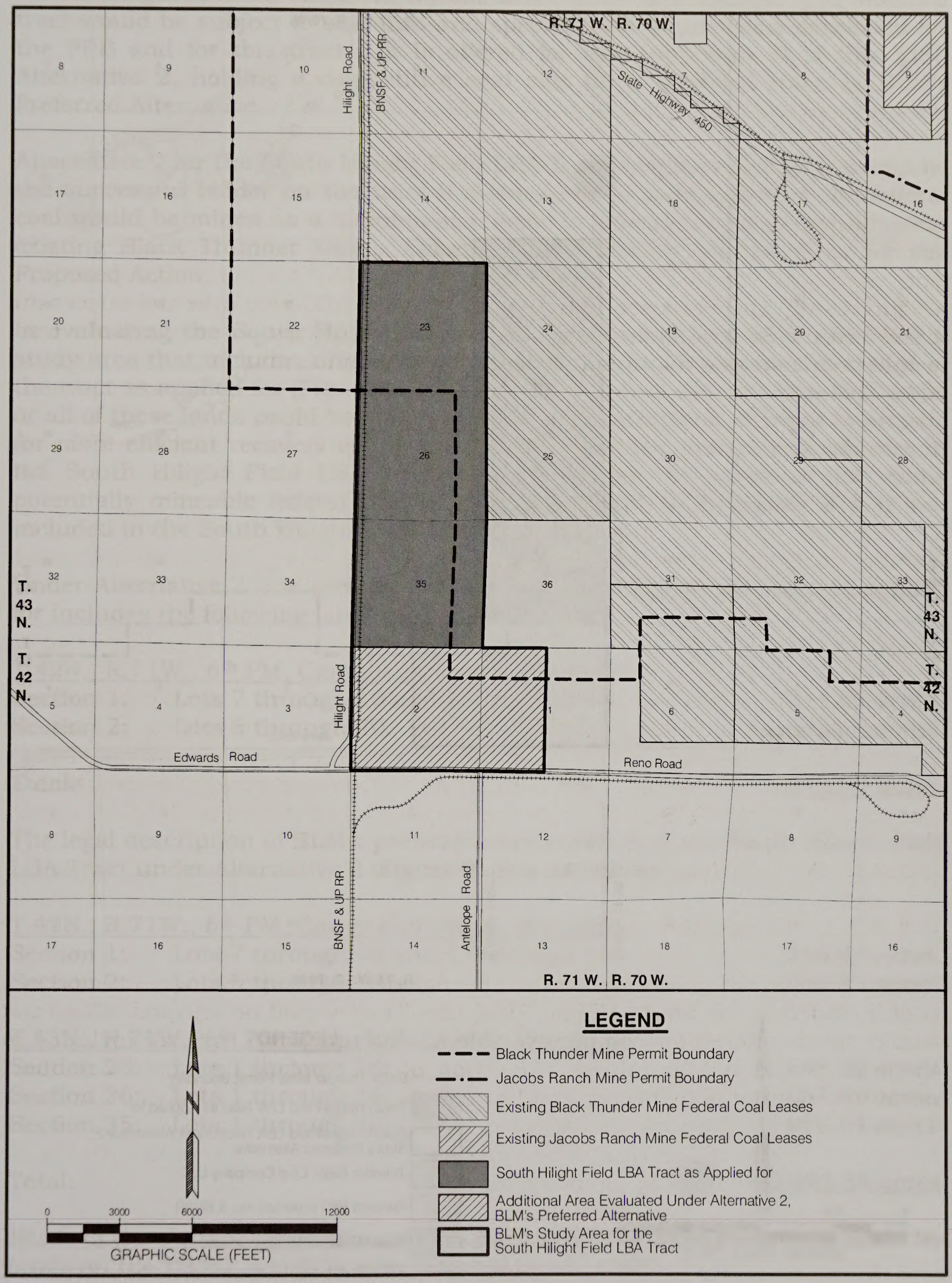


Figure G-4. South Hilight Field LBA Tract Alternatives.

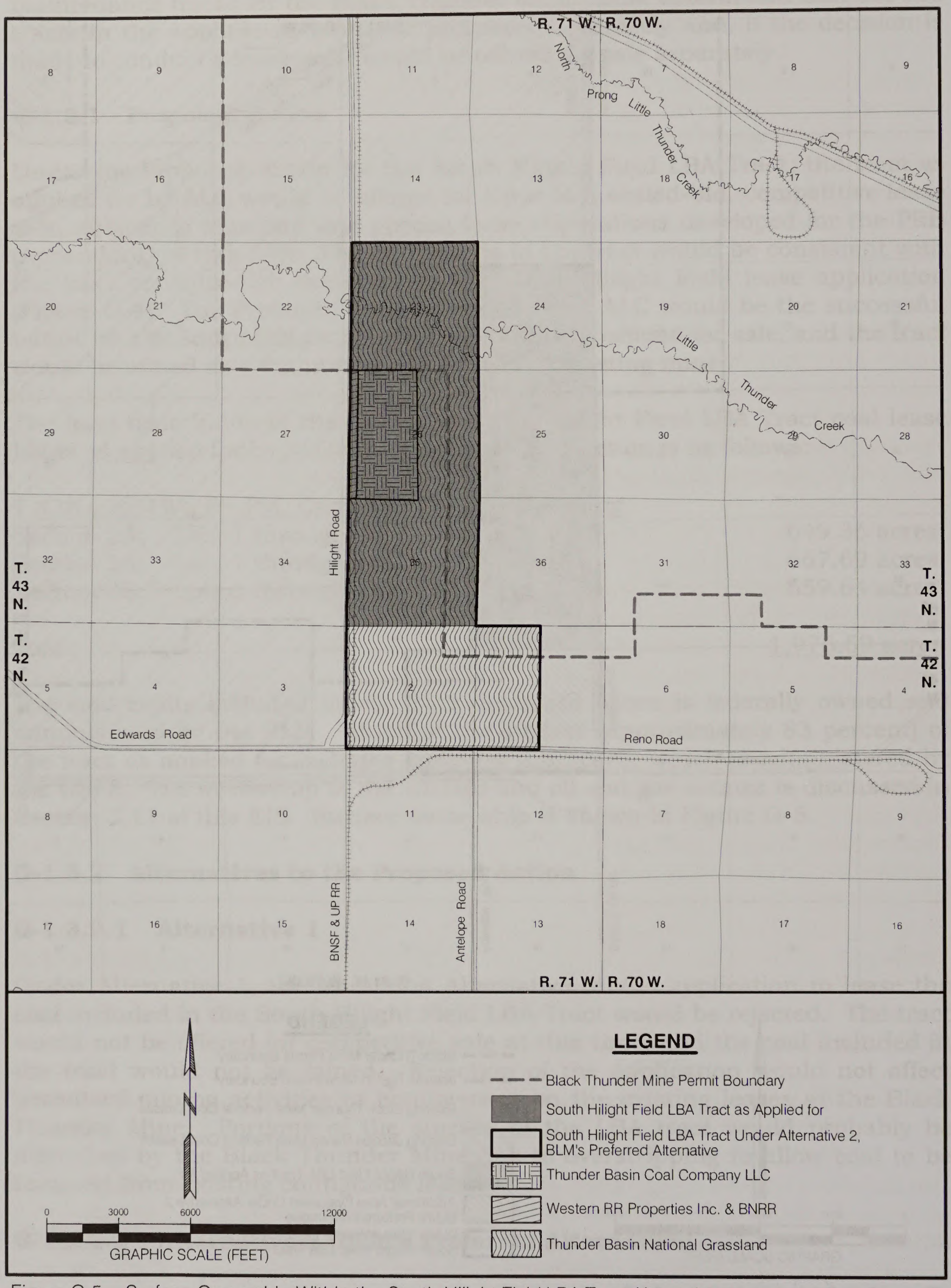


Figure G-5. Surface Ownership Within the South Hilight Field LBA Tract Alternatives.

the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the PRB and for this tract if it is offered for sale (Appendix D of this EIS). Alternative 2, holding a competitive coal sale for a modified tract, is BLM's Preferred Alternative.

Alternative 2 for the South Hilight Field LBA Tract assumes that ALC would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease to extend the life of the adjacent existing Black Thunder Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the South Hilight Field coal lease application, BLM identified a study area that includes unleased federal coal adjacent to the southern edge of the tract as applied for (Figure G-4). BLM is evaluating the potential that some or all of these lands could be added to the area to be offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the South Hilight Field LBA Tract, and/or reduce the potential that some potentially mineable federal coal in this area would be bypassed if it is not included in the South Hilight Field LBA Tract.

Under Alternative 2, the area BLM is evaluating adding to the tract as applied for includes the following lands:

| | | |
|---|---|---|
| T.42N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 1: | Lots 7 through 10 and 15 through 18; | 316.43 acres |
| Section 2: | Lots 5 through 20; | 629.26 acres |
| Total: | | 945.69 acres |

The legal description of BLM's preferred configuration of the South Hilight Field LBA Tract under Alternative 2 (Figure G-4) is as follows:

| | | |
|---|---|---|
| T.42N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 1: | Lots 7 through 10 and 15 through 18; | 316.43 acres |
| Section 2: | Lots 5 through 20; | 629.26 acres |
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 23: | Lots 1 through 16; | 649.36 acres |
| Section 26: | Lots 1 through 16; | 667.69 acres |
| Section 35: | Lots 1 through 16; | 659.64 acres |
| Total: | | 2,922.38 acres |

Much of the surface (approximately 89 percent) of the BLM study area includes lands on the TBNG, which is administered by the USFS.

## G-1.4 Description of the West Hilight Field Tract Proposed Action and Alternatives

On January 17, 2006, ALC filed an application with the BLM for federal coal reserves in a tract located west of the Black Thunder Mine in Campbell County, Wyoming (Figure G-1). The tract, which is referred to as the West Hilight Field LBA Tract, was assigned case file number WYW172388. The federal coal reserves were applied for as a maintenance tract for the Black Thunder Mine.

### G-1.4.1 Proposed Action

Under the Proposed Action for the West Hilight Field LBA Tract, the tract as applied for by ALC would be offered for lease at a sealed-bid, competitive lease sale, subject to standard and special lease stipulations developed for the PRB (Appendix D of this EIS). The boundaries of the tract would be consistent with the tract configuration proposed in the West Hilight Field lease application (Figure G-6). The Proposed Action assumes that ALC would be the successful bidder on the West Hilight Field LBA Tract if it is offered for sale, and the tract would be mined as a maintenance lease for an existing mine.

The legal description of the proposed West Hilight Field LBA Tract coal lease lands as applied for by ALC under the Proposed Action is as follows:

T.43N., R.71W., 6th PM, Campbell County, Wyoming

| | | |
|---|---|---|
| Section 8: | Lots 1, 2, and 7 through 16; | 493.00 acres |
| Section 9: | Lots 1 through 16; | 655.31 acres |
| Section 10: | Lots 3 through 6, and 11 through 14; | 327.85 acres |
| Section 17: | Lots 1 through 16; | 650.17 acres |
| Section 20: | Lots 1 through 4; | 162.54 acres |
| Section 21: | Lots 3 and 4 | 81.65 acres |
| Total: | | 2,370.52 acres |

The coal estate included in the tract described above is federally owned and administered by the BLM. A portion of the surface of the tract as applied for (approximately 30 percent) includes lands on the TBNG, which is administered by the USFS. The ownership of the surface and oil and gas estates is discussed in Section 3.11 of this EIS. Surface ownership is shown in Figure G-7.

### G-1.4.2 Alternatives to the Proposed Action

#### G-1.4.2.1 Alternative 1

Under Alternative 1, the No Action Alternative, ALC's application to lease the coal included in the West Hilight Field LBA Tract would be rejected. The tract would not be offered for competitive sale at this time, and the coal included in the tract would not be mined. Rejection of the application would not affect

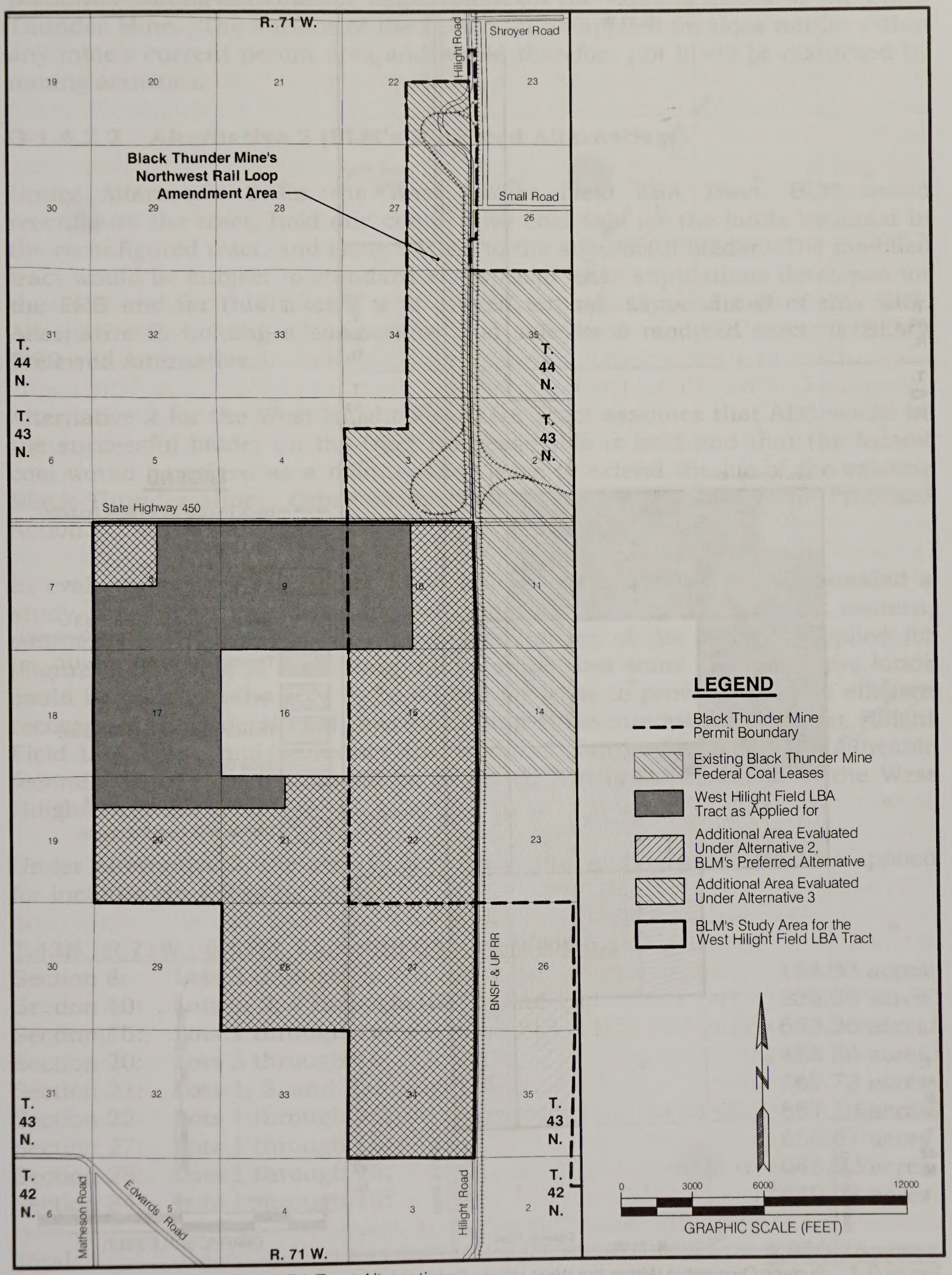


Figure G-6. West Hilight Field LBA Tract Alternatives.

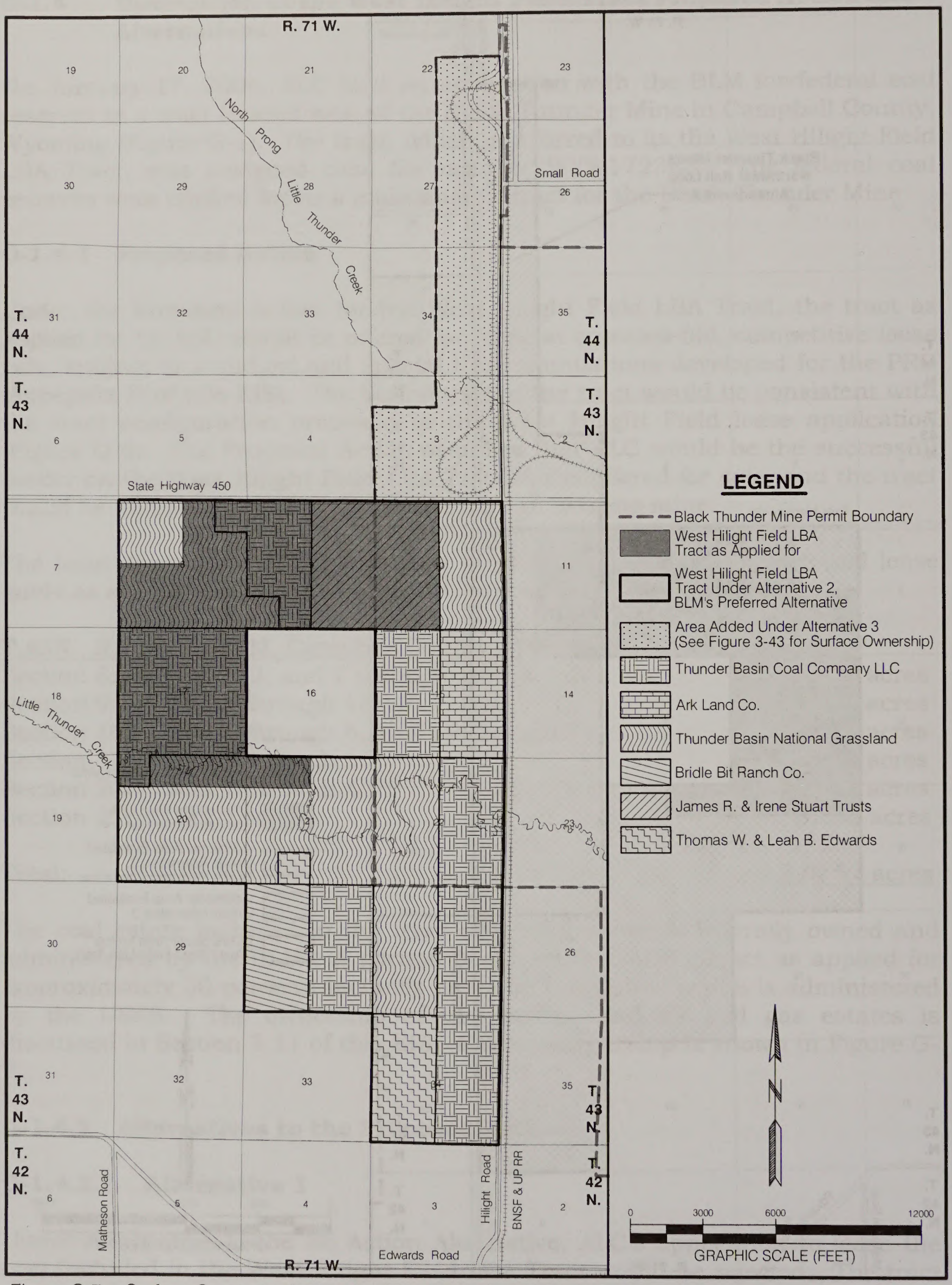


Figure G-7. Surface Ownership Within the West Hilight Field LBA Tract Alternatives.

permitted mining activities or employment on the existing leases at the Black Thunder Mine. The surface of the LBA tract as applied for does not lie within any mine's current permit area and would therefore not likely be disturbed by mining activities.

### G-1.4.2.2 Alternative 2 (BLM's Preferred Alternative)

Under Alternative 2 for the West Hilight Field LBA Tract, BLM would reconfigure the tract, hold one competitive coal sale for the lands included in the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the PRB and for this tract if it is offered for sale (Appendix D of this EIS). Alternative 2, holding a competitive coal sale for a modified tract, is BLM's Preferred Alternative.

Alternative 2 for the West Hilight Field LBA Tract assumes that ALC would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease to extend the life of the existing Black Thunder Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the West Hilight Field coal lease application, BLM identified a study area that includes unleased federal coal adjacent to the eastern, southern, northeastern, and northwestern edges of the tract as applied for (Figure G-6). BLM is evaluating the potential that some or all of these lands could be added to the area to be offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the West Hilight Field LBA Tract, and/or reduce the potential that some potentially mineable federal coal in this area would be bypassed if it is not included in the West Hilight Field LBA Tract.

Under Alternative 2, the area BLM is evaluating adding to the tract as applied for includes the following lands:

T.43N., R.71W., 6th PM, Campbell County, Wyoming

| | | |
|---|---|---|
| Section 8: | Lots 3 through 6; | 164.33 acres |
| Section 10: | Lots 1, 2, 7 through 10, 15, and 16; | 326.18 acres |
| Section 15: | Lots 1 through 16; | 659.26 acres |
| Section 20: | Lots 5 through 16; | 488.50 acres |
| Section 21: | Lots 1, 2, and 5 through 16; | 569.73 acres |
| Section 22: | Lots 1 through 16; | 657.89 acres |
| Section 27: | Lots 1 through 16; | 656.87 acres |
| Section 28: | Lots 1 through 16; | 648.02 acres |
| Section 34: | Lots 1 through 16; | 649.98 acres |
| Total: | | 4,820.76 acres |

The legal description of BLM's preferred configuration of the West Hilight Field LBA Tract under Alternative 2 (Figure G-6) is as follows:

| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
|---|---|---|
| Section 8: | Lots 1 through 16; | 654.33 acres |
| Section 9: | Lots 1 through 16; | 655.31 acres |
| Section 10: | Lots 1 through 16; | 654.03 acres |
| Section 15: | Lots 1 through 16; | 659.26 acres |
| Section 17: | Lots 1 through 16; | 650.17 acres |
| Section 20: | Lots 1 through 16; | 651.04 acres |
| Section 21: | Lots 1 through 16; | 651.38 acres |
| Section 22: | Lots 1 through 16; | 657.89 acres |
| Section 27: | Lots 1 through 16; | 656.87 acres |
| Section 28: | Lots 1 through 16; | 648.02 acres |
| Section 34: | Lots 1 through 16; | 649.98 acres |
| Total: | | 7,191.28 acres |

Approximately 40 percent of the West Hilight Field LBA Tract under Alternative 2 includes lands on the TBNG, which is administered by the USFS.

### G-1.4.2.3 Alternative 3

Under Alternative 3 for the West Hilight Field LBA Tract, BLM is considering adding some or all of the BLM study area, as discussed under Alternative 2 and some or all of TBCC's Northwest Rail Loop Amendment Area (Figure G-6). Under Alternative 3, BLM would reconfigure the tract, hold one competitive coal sale for the lands included in the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the PRB and for this tract if it is offered for sale (Appendix D of this EIS).

Alternative 3 for the West Hilight Field LBA Tract assumes that ALC would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease for the existing Black Thunder Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the West Hilight Field coal lease application, BLM identified a study area that includes unleased federal coal adjacent to the eastern, southern, northeastern, and northwestern edges of the tract as applied for (Figure G-6). BLM is evaluating the potential that some or all of these lands could be added to the area to be offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the West Hilight Field LBA Tract, and/or reduce the potential that some potentially mineable federal coal in this area would be bypassed if it is not included in the West Hilight Field LBA Tract.

Under Alternative 3, BLM is considering adding some or all of Black Thunder Mine's Northwest Rail Loop Amendment Area, which is entirely within Black Thunder Mine's current permit area. Black Thunder Mine completed the construction of a new train loadout facility within their Northwest Rail Loop Amendment Area in 2008. This area is also entirely within the West Jacobs Ranch LBA Tract; therefore, BLM has not included it within the study area for the West Hilight Field LBA Tract. However, this alternate tract configuration will preserve the option of delineating some or all of TBCC's Northwest Rail Loop Amendment Area into the West Hilight Field, and West Jacobs Ranch, or both LBA tracts.

Under Alternative 3, the lands within TBCC's Northwest Rail Loop Amendment Area that BLM is evaluating adding to the Alternative 2 reconfiguration of the West Hilight Field LBA Tract are as follows:

| | | |
|---|---|---|
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 3: | Lots 2, 5, and 8 through 19; | 557.99 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 22: | Lots 9, 10, 15, and 16; | 164.25 acres |
| Section 27: | Lots 1, 2, 7 through 10, 15, and 16; | 327.88 acres |
| Section 34: | Lots 1, 2, 7 through 10, 15, and 16; | 328.73 acres |
| Total: | | 1,378.85 acres |

The legal description of the Alternative 3 reconfiguration of the West Hilight Field LBA Tract is as follows:

| | | |
|---|---|---|
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 3: | Lots 2, 5, and 8 through 19; | 557.99 acres |
| Section 8: | Lots 1 through 16; | 654.33 acres |
| Section 9: | Lots 1 through 16; | 655.31 acres |
| Section 10: | Lots 1 through 16; | 654.03 acres |
| Section 15: | Lots 1 through 16; | 659.26 acres |
| Section 17: | Lots 1 through 16; | 650.17 acres |
| Section 20: | Lots 1 through 16; | 651.04 acres |
| Section 21: | Lots 1 through 16; | 651.38 acres |
| Section 22: | Lots 1 through 16; | 657.89 acres |
| Section 27: | Lots 1 through 16; | 656.87 acres |
| Section 28: | Lots 1 through 16; | 648.02 acres |
| Section 34: | Lots 1 through 16; | 649.98 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 22: | Lots 9, 10, 15, and 16; | 164.25 acres |
| Section 27: | Lots 1, 2, 7 through 10, 15, and 16; | 327.88 acres |
| Section 34: | Lots 1, 2, 7 through 10, 15, and 16; | 328.73 acres |
| Total: | | 8,570.13 acres |

Approximately 35 percent of the West Hilight Field LBA Tract under Alternative 3 includes lands on the TBNG, which is administered by the USFS.

## G-1.5 Description of the West Jacobs Ranch Tract Proposed Action and Alternatives

On March 22, 2006, Jacobs Ranch Coal Company (JRCC) filed an application with the BLM for federal coal reserves in a tract located approximately 0.75 mile west of the Jacobs Ranch Mine in Campbell County, Wyoming. The tract, which is referred to as the West Jacobs Ranch LBA Tract, is located approximately 2.5 miles east of Wright, Wyoming (Figure G-1). JRCC's coal lease application was assigned case file number WYW172685. The federal coal reserves were applied for as a maintenance tract for the Jacobs Ranch Mine.

On October 1, 2009, the Jacobs Ranch Mine was acquired by Arch Coal, Inc. Ark Land Company (ALC), a wholly owned subsidiary of Arch Coal, Inc., intends to consolidate the permits for the Jacobs Ranch Mine and the Black Thunder Mine in order to integrate the two separate mining operations. In this BA, the applicant for the West Jacobs Ranch LBA Tract will be referred to as ALC.

### G-1.5.1 Proposed Action

Under the Proposed Action for the West Jacobs Ranch LBA Tract, the tract as applied for by ALC would be offered for lease at a sealed-bid, competitive lease sale, subject to standard and special lease stipulations developed for the PRB (Appendix D of this EIS). The boundaries of the tract would be consistent with the tract configuration proposed in the West Jacobs Ranch LBA Tract lease application (Figure G-8). The Proposed Action assumes that ALC would be the successful bidder on the West Jacobs Ranch LBA Tract if it is offered for sale, and the tract would be mined as a maintenance lease for an existing mine.

The legal description of the proposed West Jacobs Ranch LBA Tract coal lease lands as applied for by ALC under the Proposed Action is as follows:

| | | |
|---|---|---|
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 3: | Lots 2 and 5 through 19; | 638.38 acres |
| Section 4: | Lots 5 through 20; | 639.50 acres |
| Section 5: | Lots 5 through 20; | 636.67 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 22: | Lots 9 through 16; | 326.99 acres |
| Section 27: | Lots 1 through 16; | 658.21 acres |
| Section 28: | Lots 1 through 3 and 5 through 16; | 608.43 acres |
| Section 29: | Lots 5 through 15 and SE¼SE¼; | 478.10 acres |
| Section 32: | Lots 1 through 15 and SW¼SE¼; | 643.83 acres |
| Section 33: | Lots 1 through 15 and NE¼SE¼ ; | 653.02 acres |
| Section 34: | Lots 1 through 16; | 661.24 acres |

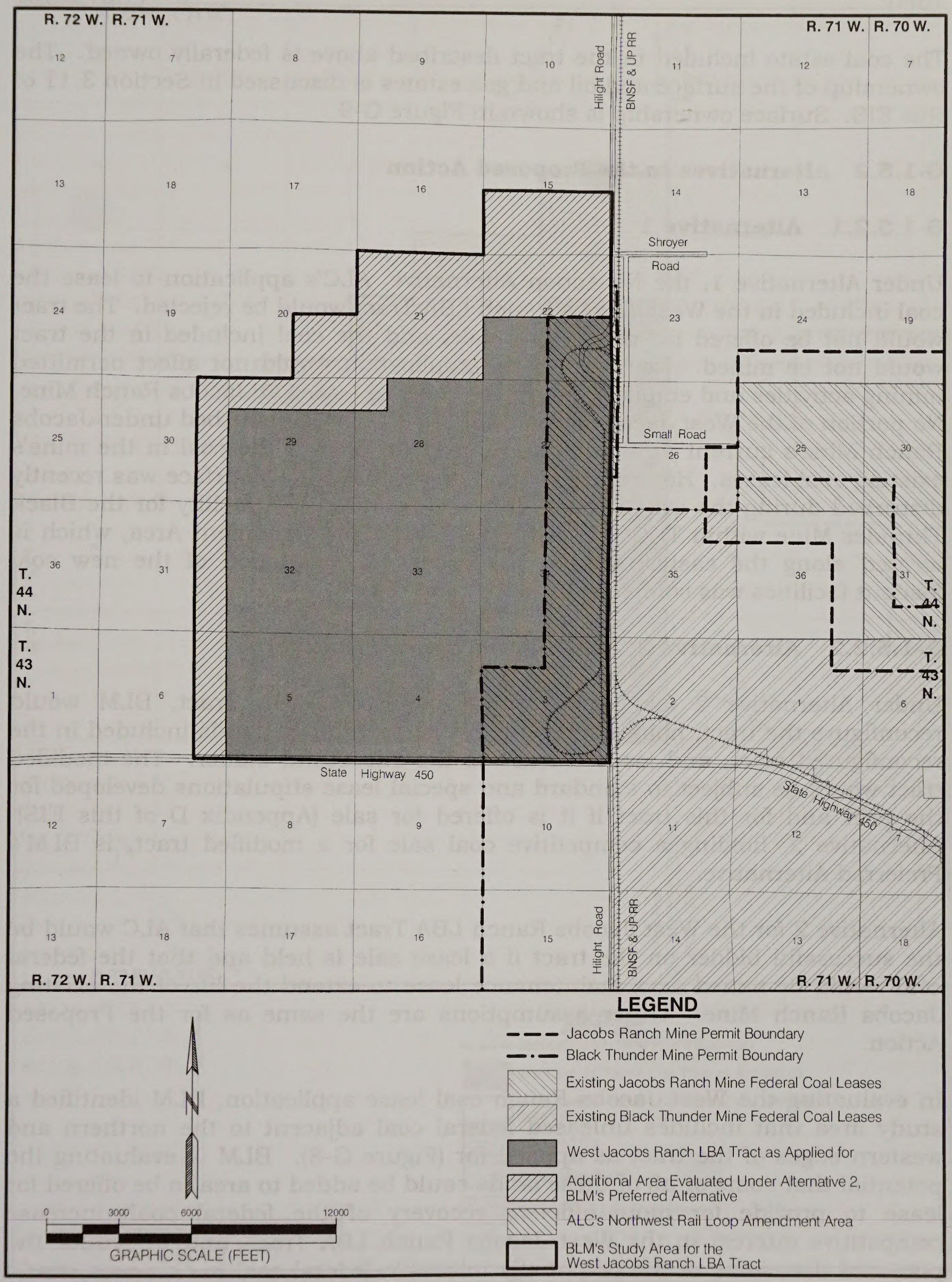


Figure G-8. West Jacobs Ranch LBA Tract Alternatives.

Total: 5,944.37 acres

The coal estate included in the tract described above is federally owned. The ownership of the surface and oil and gas estates is discussed in Section 3.11 of this EIS. Surface ownership is shown in Figure G-9.

### G-1.5.2 Alternatives to the Proposed Action

#### G-1.5.2.1 Alternative 1

Under Alternative 1, the No Action Alternative, ALC's application to lease the coal included in the West Jacobs Ranch LBA Tract would be rejected. The tract would not be offered for competitive sale, and the coal included in the tract would not be mined. Rejection of the application would not affect permitted mining activities and employment on the existing leases at Jacobs Ranch Mine. No portion of the West Jacobs Ranch LBA Tract will be disturbed under Jacobs Ranch Mine's current mining plans in order to recover the coal in the mine's existing coal leases. However, a portion of the LBA tract's surface was recently disturbed during the construction of a new train loadout facility for the Black Thunder Mine within TBCC's Northwest Rail Loop Amendment Area, which is located along the eastern side of the tract. Construction of the new coal loadout facilities was completed in 2008 (Figure G-8).

#### G-1.5.2.2 Alternative 2 (BLM's Preferred Alternative)

Under Alternative 2 for the West Jacobs Ranch LBA Tract, BLM would reconfigure the tract, hold a competitive coal sale for the lands included in the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the PRB and for this tract if it is offered for sale (Appendix D of this EIS). Alternative 2, holding a competitive coal sale for a modified tract, is BLM's Preferred Alternative.

Alternative 2 for the West Jacobs Ranch LBA Tract assumes that ALC would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease to extend the life of the existing Jacobs Ranch Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the West Jacobs Ranch coal lease application, BLM identified a study area that includes unleased federal coal adjacent to the northern and western edges of the tract as applied for (Figure G-8). BLM is evaluating the potential that some or all of these lands could be added to area to be offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the West Jacobs Ranch LBA Tract, and/or reduce the potential that some of the potentially mineable federal coal in this area would be bypassed if it is not included in the West Jacobs Ranch LBA Tract.

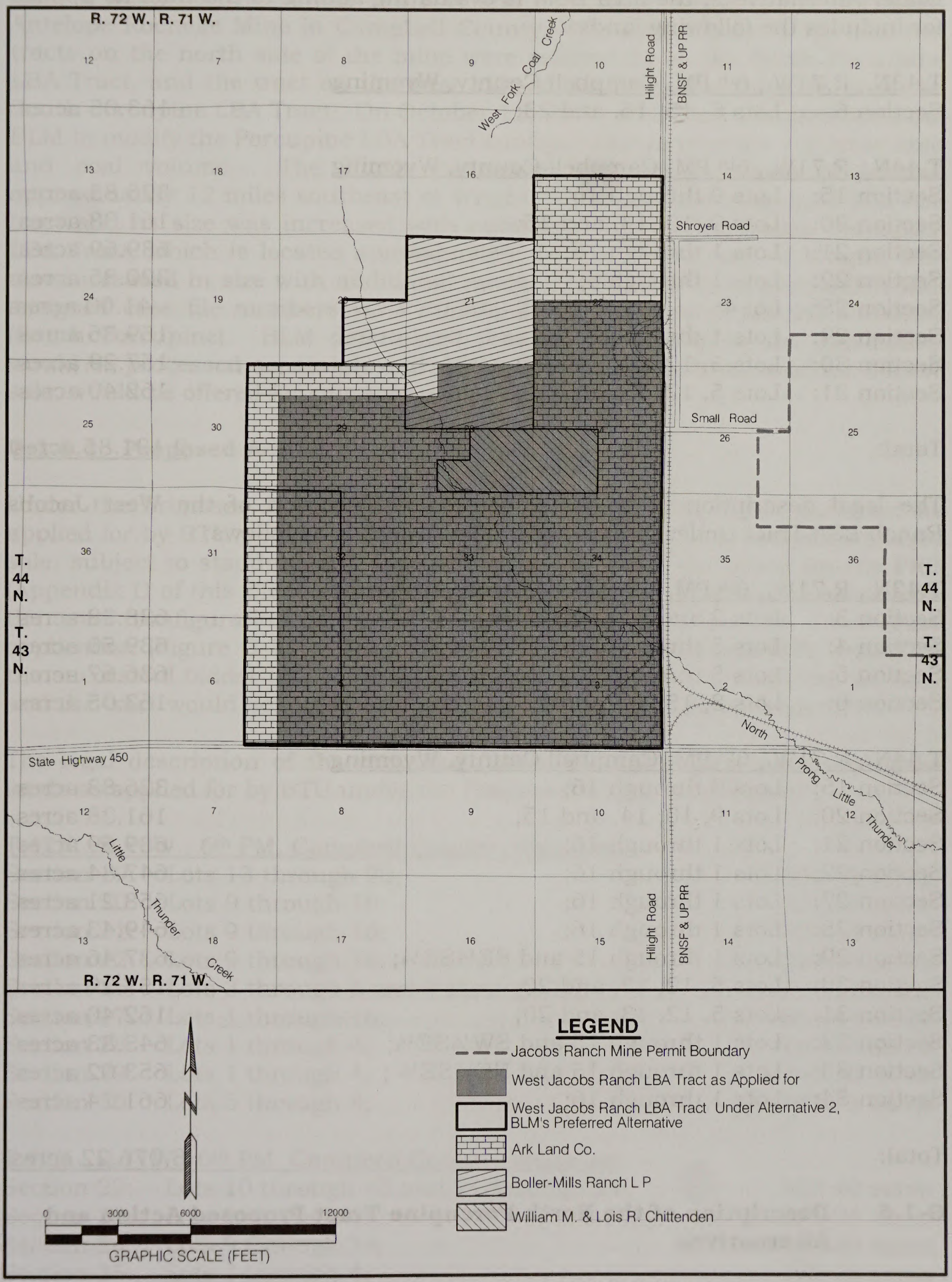


Figure G-9. Surface Ownership Within the West Jacobs Ranch LBA Tract Alternatives.

Under Alternative 2, the area BLM is evaluating adding to the tract as applied for includes the following lands:

| | | |
|---|---|---|
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 6: | Lots 8, 15, 16, and 23; | 163.05 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 15: | Lots 9 through 16; | 326.83 acres |
| Section 20: | Lots 9, 10, 14, and 15; | 161.38 acres |
| Section 21: | Lots 1 through 16; | 639.69 acres |
| Section 22: | Lots 1 through 8; | 320.85 acres |
| Section 28: | Lot 4; | 41.00 acres |
| Section 29: | Lots 1 through 4; | 159.36 acres |
| Section 30: | Lots 5, 12, 13, and 20; | 157.29 acres |
| Section 31: | Lots 5, 12, 13, and 20; | 162.40 acres |
| Total: | | 2,131.85 acres |

The legal description of BLM's preferred configuration of the West Jacobs Ranch LBA Tract under Alternative 2 (Figure G-8) is as follows:

| | | |
|---|---|---|
| T.43N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 3: | Lots 2 and 5 through 19; | 638.38 acres |
| Section 4: | Lots 5 through 20; | 639.50 acres |
| Section 5: | Lots 5 through 20; | 636.67 acres |
| Section 6: | Lots 8, 15, 16, and 23; | 163.05 acres |
| T.44N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 15: | Lots 9 through 16; | 326.83 acres |
| Section 20: | Lots 9, 10, 14, and 15; | 161.38 acres |
| Section 21: | Lots 1 through 16; | 639.69 acres |
| Section 22: | Lots 1 through 16; | 647.84 acres |
| Section 27: | Lots 1 through 16; | 658.21 acres |
| Section 28: | Lots 1 through 16; | 649.43 acres |
| Section 29: | Lots 1 through 15 and SE¼SE¼; | 637.46 acres |
| Section 30: | Lots 5, 12, 13, and 20; | 157.29 acres |
| Section 31: | Lots 5, 12, 13, and 20; | 162.40 acres |
| Section 32: | Lots 1 through 15 and SW¼SE¼; | 643.83 acres |
| Section 33: | Lots 1 through 15 and NE¼SE¼ ; | 653.02 acres |
| Section 34: | Lots 1 through 16; | 661.24 acres |
| Total: | | 8,076.22 acres |

## G-1.6 Description of the North Porcupine Tract Proposed Action and Alternatives

On September 29, 2006, BTU Western Resources, Inc. (BTU) filed an application with the BLM for federal coal reserves in three separate tracts

located west, northwest, and north of and immediately adjacent to the North Antelope Rochelle Mine in Campbell County, Wyoming (Figure G-1). The two tracts on the north side of the mine were referred to as the North Porcupine LBA Tract, and the tract on the west side of the mine was referred to as the South Porcupine LBA Tract. On October 12, 2007, BTU filed a request with the BLM to modify the Porcupine LBA Tract configuration to increase the lease area and coal volume. The North Porcupine LBA Tract, which is located approximately 12 miles southeast of Wright, Wyoming, was combined into one tract and its size was increased with additional lands. The South Porcupine LBA Tract, which is located approximately 14 miles southeast of Wright, was also increased in size with additional lands. BTU's coal lease application was assigned case file numbers WYW173408 (North Porcupine) and WYW176095 (South Porcupine). BLM determined that the two tracts in the application would be processed separately and, if the decision is made to conduct a lease sale, would be offered for sale separately.

### G-1.6.1 Proposed Action

Under the Proposed Action for the North Porcupine LBA Tract, the tract as applied for by BTU would be offered for lease at a sealed-bid, competitive lease sale, subject to standard and special lease stipulations developed for the PRB (Appendix D of this EIS). The boundaries of the tract would be consistent with the tract configuration proposed in the North Porcupine LBA Tract lease application (Figure G-10). The Proposed Action assumes that BTU would be the successful bidder on the North Porcupine LBA Tract if it is offered for sale, and the tract would be mined as a maintenance lease for an existing mine.

The legal description of the proposed North Porcupine LBA Tract coal lease lands as applied for by BTU under the Proposed Action is as follows:

| | | |
|---|---|---|
| T.42N., R.70W., 6th PM, Campbell County, Wyoming | | |
| Section 19: | Lots 13 through 20; | 296.94 acres |
| Section 20: | Lots 9 through 16; | 328.00 acres |
| Section 21: | Lots 9 through 16; | 329.54 acres |
| Section 22: | Lots 9 through 16; | 327.74 acres |
| Section 26: | Lots 3 through 6 and 9 through 16; | 496.64 acres |
| Section 27: | Lots 1 through 16; | 664.48 acres |
| Section 28: | Lots 1 through 4; | 165.98 acres |
| Section 29 | Lots 1 through 4; | 164.30 acres |
| Section 30: | Lots 5 through 8; | 147.79 acres |
| T.42N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 22: | Lots 10 through 15 and 21 through 24; | 323.49 acres |
| Section 23: | Lots 9 through 16; | 324.94 acres |
| Section 24: | Lots 9 through 16; | 325.82 acres |
| Section 25: | Lots 1 through 4; | 162.96 acres |
| Section 26: | Lots 1 through 6 and 11 through 14; | 404.09 acres |
| Section 27: | Lots 2 through 6, 9, 12, and 15 through 30; | 649.42 acres |

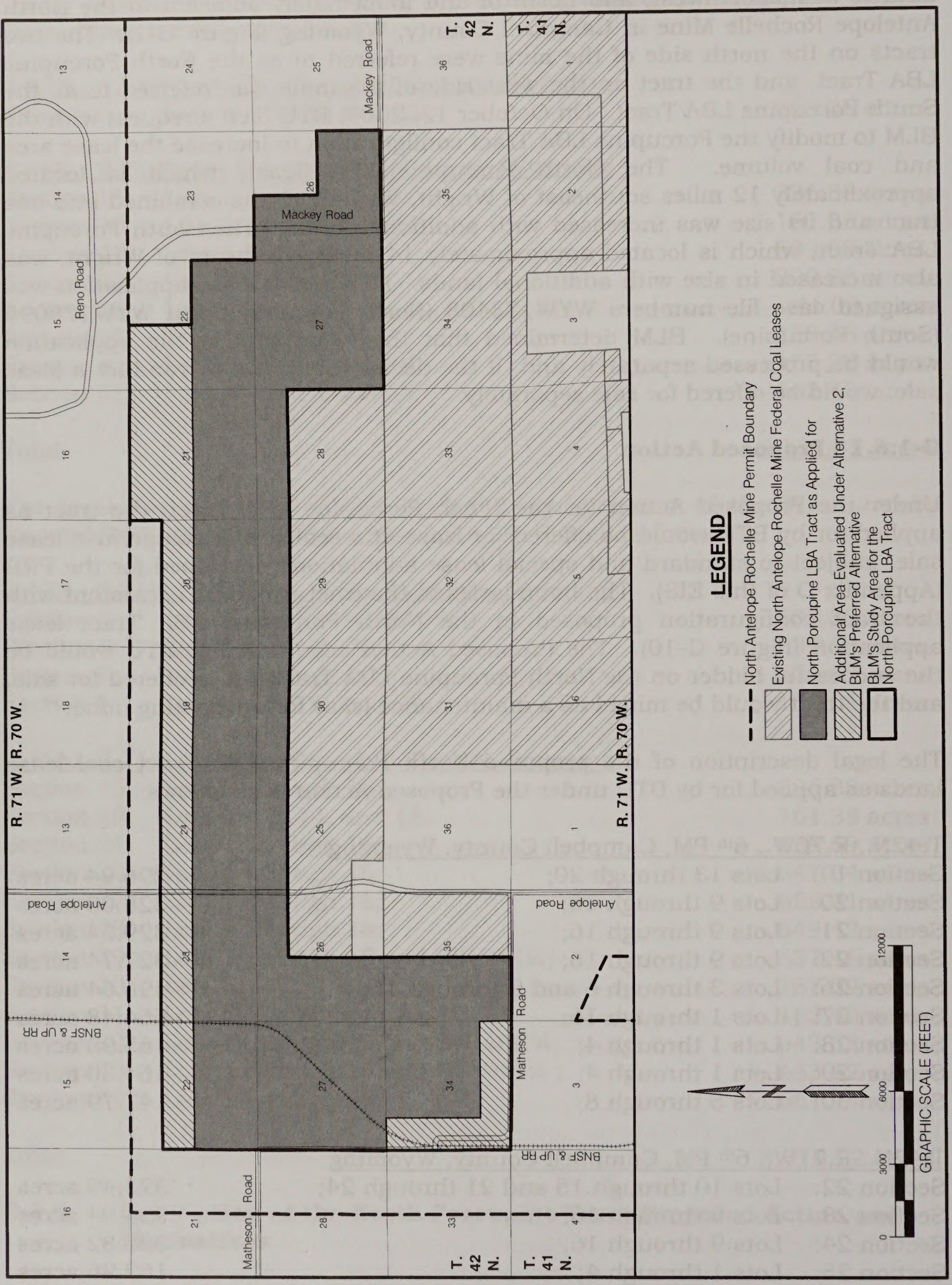


Figure G-10. North Porcupine LBA Tract Alternatives.

| | | |
|---|---|---|
| Section 34: | Lots 1 through 3 and 6 through 11; | 360.46 acres |
| Section 35: | Lots 3 through 6 and 11 through 14; | 323.19 acres |
| Total: | | 5,795.78 acres |

The coal estate included in the tract described above is federally owned. Much of the surface (approximately 85 percent) of the tract as applied for includes lands on the TBNG, which is administered by the USFS. The ownership of the surface and oil and gas estates is discussed in Section 3.11 of this EIS. Surface ownership is shown in Figure G-11.

### G-1.6.2 Alternatives to the Proposed Action

#### G-1.6.2.1 Alternative 1

Under Alternative 1, the No Action Alternative, BTU's application to lease the coal included in the North Porcupine LBA Tract would be rejected. The tract would not be offered for competitive sale at this time, and the coal included in the tract would not be mined. Rejection of the application would not affect permitted mining activities or employment on the existing leases at the North Antelope Rochelle Mine. Portions of the surface of the LBA tract will be disturbed due to overstripping to allow coal to be removed from existing contiguous leases.

#### G-1.6.2.2 Alternative 2 (BLM's Preferred Alternative)

Under Alternative 2 for the North Porcupine LBA Tract, BLM would reconfigure the tract, hold one competitive coal sale for the lands included in the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the PRB and for this tract if it is offered for sale (Appendix D of this EIS). Alternative 2, holding a competitive coal sale for a modified tract, is BLM's Preferred Alternative.

Alternative 2 for the North Porcupine LBA Tract assumes that BTU would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease to extend the life of the existing North Antelope Rochelle Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the North Porcupine coal lease application, BLM identified a study area that includes unleased federal coal adjacent the northern and southwestern edges of the tract as applied for (Figure G-10). BLM is evaluating the potential that some or all of these lands could be added to the area offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the North Porcupine LBA Tract, and/or reduce the potential that some of the potentially mineable federal coal in this area would be bypassed if it is not included in the North Porcupine LBA Tract.

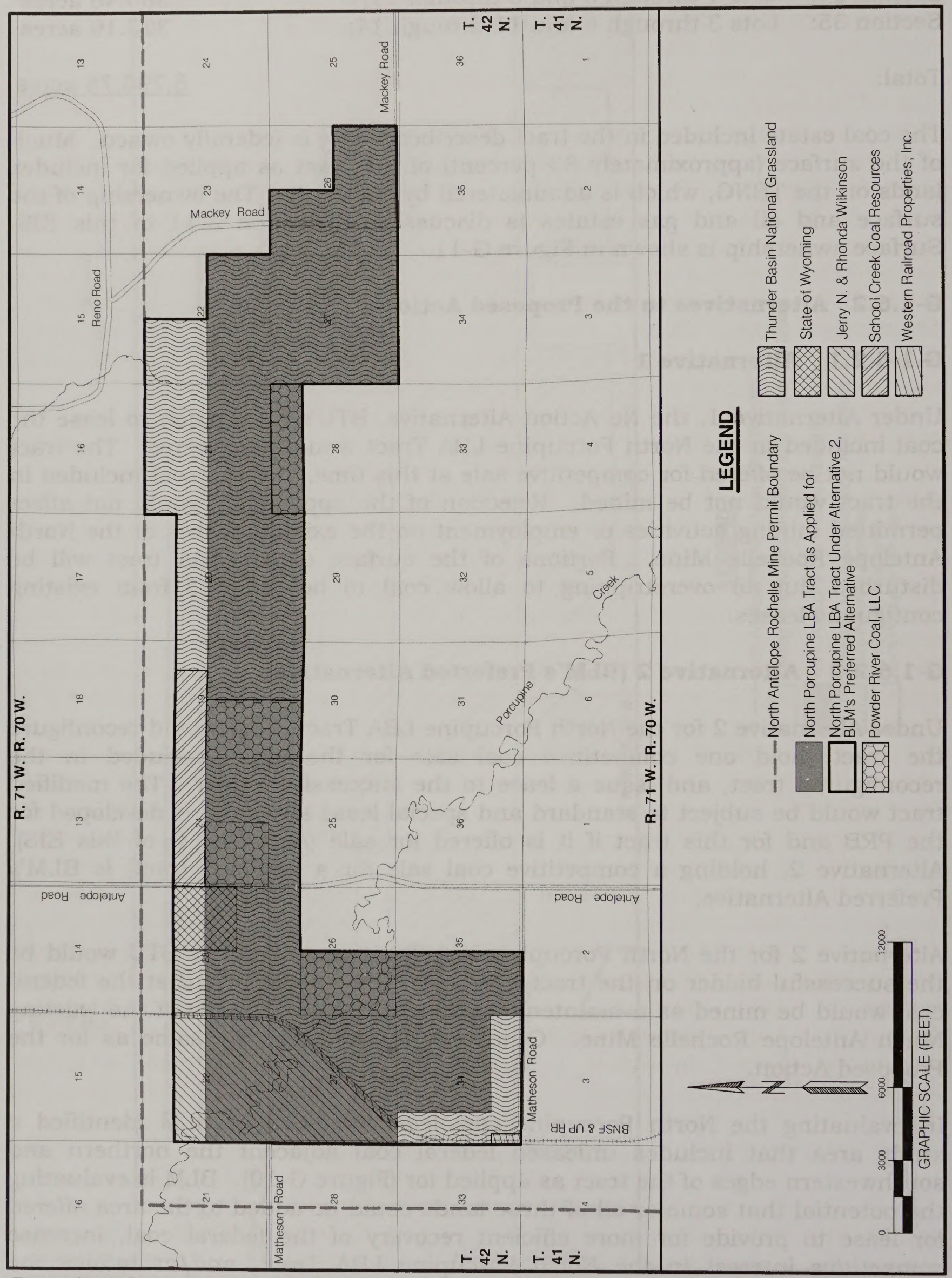


Figure G-11. Surface Ownership Within the North Porcupine LBA Tract Alternatives.

Under Alternative 2, the area BLM is evaluating adding to the tract as applied for includes the following lands:

| | | |
|---|---|---|
| T.42N., R.70W., 6th PM, Campbell County, Wyoming | | |
| Section 19: | Lots 9 through 12; | 149.02 acres |
| Section 20: | Lots 5 through 8; | 162.93 acres |
| Section 21: | Lots l through 8; | 330.71 acres |
| Section 22: | Lots 3 through 6; | 163.80 acres |
| T.42N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 22: | Lots 5 through 7, 19, and 20; | 162.70 acres |
| Section 23: | Lots 5 through 8; | 162.51 acres |
| Section 24: | Lots 5 through 8; | 163.30 acres |
| Section 34: | Lots 4, 5, and 12 through 16; | 276.04 acres |
| Total: | | 1,572.01 acres |

The legal description of BLM's preferred configuration of the North Porcupine LBA Tract under Alternative 2 (Figure G-10) is as follows:

| | | |
|---|---|---|
| T.42N., R.70W., 6th PM, Campbell County, Wyoming | | |
| Section 19: | Lots 9 through 20; | 445.96 acres |
| Section 20: | Lots 5 through 16; | 490.93 acres |
| Section 21: | Lots 1 through 16; | 660.25 acres |
| Section 22: | Lots 3 through 6 and 9 through 16; | 491.54 acres |
| Section 26: | Lots 3 through 6 and 9 through 16; | 496.64 acres |
| Section 27: | Lots 1 through 16; | 664.48 acres |
| Section 28: | Lots 1 through 4; | 165.98 acres |
| Section 29 | Lots 1 through 4; | 164.30 acres |
| Section 30: | Lots 5 through 8; | 147.79 acres |
| T.42N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 22: | Lots 5 through 7, 10 through 15, and 19 through 24; | 486.19 acres |
| Section 23: | Lots 5 through 16; | 487.45 acres |
| Section 24: | Lots 5 through 16; | 489.12 acres |
| Section 25: | Lots 1 through 4; | 162.96 acres |
| Section 26: | Lots 1 through 6 and 11 through 14; | 404.09 acres |
| Section 27: | Lots 2 through 6, 9, 12, and 15 through 30; | 649.42 acres |
| Section 34: | Lots 1 through 16; | 636.50 acres |
| Section 35: | Lots 3 through 6 and 11 through 14; | 323.19 acres |
| Total: | | 7,366.79 acres |

Much of the surface (approximately 83 percent) of the BLM study area includes lands on the TBNG, which is administered by the USFS.

## G-1.7 Description of the South Porcupine Tract Proposed Action and Alternatives

On September 29, 2006, BTU Western Resources, Inc. (BTU) filed an application with the BLM for federal coal reserves in three separate tracts located west, northwest, and north of and immediately adjacent to the North Antelope Rochelle Mine in Campbell County, Wyoming (Figure G-1). The two tracts on the north side of the mine were referred to as the North Porcupine LBA Tract, and the tract on the west side of the mine was referred to as the South Porcupine LBA Tract. On October 12, 2007, BTU filed a request with the BLM to modify the Porcupine LBA Tract configuration to increase the lease area and coal volume. The North Porcupine LBA Tract, which is located approximately 12 miles southeast of Wright, Wyoming, was combined into one tract and its size was increased with additional lands. The South Porcupine LBA Tract, which is located approximately 14 miles southeast of Wright, was also increased in size with additional lands. BTU's coal lease application was assigned case file numbers WYW173408 (North Porcupine) and WYW176095 (South Porcupine). BLM determined that the two tracts in the application would be processed separately and, if the decision is made to conduct a lease sale, would be offered for sale separately.

### G-1.7.1 Proposed Action

Under the Proposed Action for the South Porcupine LBA Tract, the tract as applied for by BTU would be offered for lease at a sealed-bid, competitive lease sale, subject to standard and special lease stipulations developed for the PRB (Appendix D of this EIS). The boundaries of the tract would be consistent with the tract configuration proposed in the South Porcupine LBA Tract lease application (Figure G-12). The Proposed Action assumes that BTU would be the successful bidder on the South Porcupine LBA Tract if it is offered for sale, and the tract would be mined as a maintenance lease for an existing mine.

The legal description of the proposed South Porcupine LBA Tract coal lease lands as applied for by BTU under the Proposed Action is as follows:

| | | |
|---|---|---|
| T.41N., R.70W., 6th PM, Campbell County, Wyoming | | |
| Section 7: | Lots 7 through 10 and 15 through 18; | 320.94 acres |
| Section 18: | Lots 6 through 11 and 14 through 19; | 479.71 acres |
| T.41N., R.71W., 6th PM, Campbell County, Wyoming | | |
| Section 1: | Lots 5 through 20; | 638.15 acres |
| Section 12: | Lots 1 through 16; | 678.52 acres |
| Section 13: | Lots 1 through 16; | 668.93 acres |
| Section 14: | Lots 1, 8, 9, and 16; | 154.62 acres |
| Section 23: | Lot 1 and N½ of Lot 8; | 59.81 acres |
| Section 24: | Lots 2 through 4 and N½ of Lots 5, 6 and 7; | 185.28 acres |
| Total: | | 3,185.96 acres |

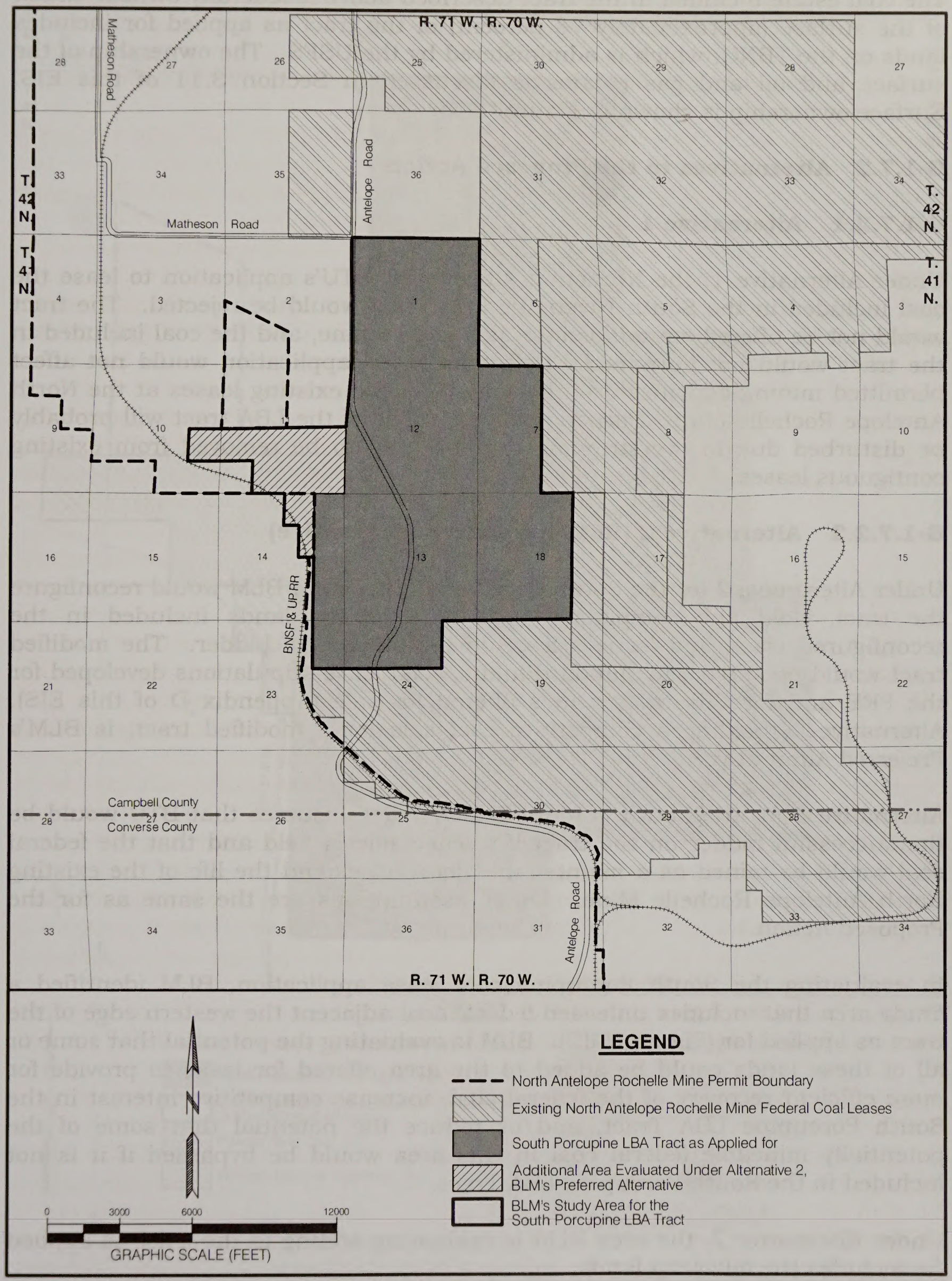


Figure G-12. South Porcupine LBA Tract Alternatives.

The coal estate included in the tract described above is federally owned. Much of the surface (approximately 78 percent) of the tract as applied for includes lands on the TBNG, which is administered by the USFS. The ownership of the surface and oil and gas estates is discussed in Section 3.11 of this EIS. Surface ownership is shown in Figure G-13.

### G-1.7.2 Alternatives to the Proposed Action

#### G-1.7.2.1 Alternative 1

Under Alternative 1, the No Action Alternative, BTU's application to lease the coal included in the South Porcupine LBA Tract would be rejected. The tract would not be offered for competitive sale at this time, and the coal included in the tract would not be mined. Rejection of the application would not affect permitted mining activities or employment on the existing leases at the North Antelope Rochelle Mine. Portions of the surface of the LBA tract will probably be disturbed due to overstripping to allow coal to be removed from existing contiguous leases.

#### G-1.7.2.2 Alternative 2 (BLM's Preferred Alternative)

Under Alternative 2 for the South Porcupine LBA Tract, BLM would reconfigure the tract, hold one competitive coal sale for the lands included in the reconfigured tract, and issue a lease to the successful bidder. The modified tract would be subject to standard and special lease stipulations developed for the PRB and for this tract if it is offered for sale (Appendix D of this EIS). Alternative 2, holding a competitive coal sale for a modified tract, is BLM's Preferred Alternative.

Alternative 2 for the South Porcupine LBA Tract assumes that BTU would be the successful bidder on the tract if a lease sale is held and that the federal coal would be mined as a maintenance lease to extend the life of the existing North Antelope Rochelle Mine. Other assumptions are the same as for the Proposed Action.

In evaluating the South Porcupine coal lease application, BLM identified a study area that includes unleased federal coal adjacent the western edge of the tract as applied for (Figure G-12). BLM is evaluating the potential that some or all of these lands could be added to the area offered for lease to provide for more efficient recovery of the federal coal, increase competitive interest in the South Porcupine LBA Tract, and/or reduce the potential that some of the potentially mineable federal coal in this area would be bypassed if it is not included in the South Porcupine LBA Tract.

Under Alternative 2, the area BLM is evaluating adding to the tract as applied for includes the following lands:

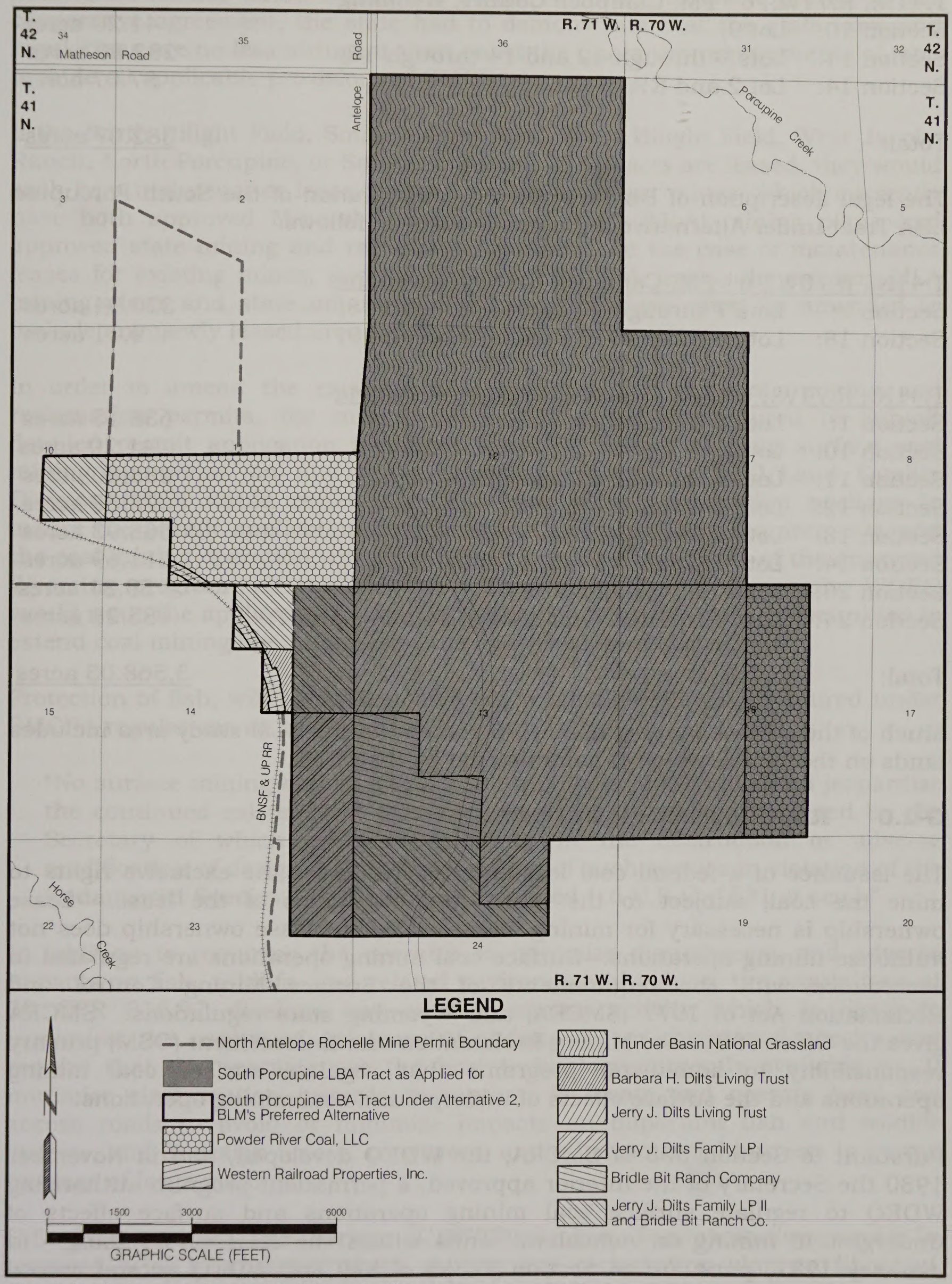


Figure G-13. Surface Ownership Within the South Porcupine LBA Tract Alternatives.

| T.41N., R.71W., 6th PM, Campbell County, Wyoming | | |
|---|---|---|
| Section 10: | Lot 9; | 41.20 acres |
| Section 11: | Lots 9 through 12 and 14 through 16; | 283.80 acres |
| Section 14: | Lot 2 and E½ of Lot 7; | 57.07 acres |
| Total: | | 382.07 acres |

The legal description of BLM's preferred configuration of the South Porcupine LBA Tract under Alternative 2 (Figure G-12) is as follows:

| T.41N., R.70W., 6th PM, Campbell County, Wyoming | | |
|---|---|---|
| Section 7: | Lots 7 through 10 and 15 through 18; | 320.94 acres |
| Section 18: | Lots 6 through 11 and 14 through 19; | 479.71 acres |

| T.41N., R.71W., 6th PM, Campbell County, Wyoming | | |
|---|---|---|
| Section 1: | Lots 5 through 20; | 638.15 acres |
| Section 10: | Lot 9; | 41.20 acres |
| Section 11: | Lots 9 through 12 and 14 through 16; | 283.80 acres |
| Section 12: | Lots 1 through 16; | 678.52 acres |
| Section 13: | Lots 1 through 16; | 668.93 acres |
| Section 14: | Lots 1, 2, E½ of 7, 8, 9, and 16; | 211.69 acres |
| Section 23: | Lot 1 and N½ of Lot 8; | 59.81 acres |
| Section 24: | Lots 2 through 4 and N½ of Lots 5, 6 and 7; | 185.28 acres |
| Total: | | 3,568.03 acres |

Much of the surface (approximately 70 percent) of the BLM study area includes lands on the TBNG, which is administered by the USFS.

## G-2.0 REGULATORY FRAMEWORK

The issuance of a federal coal lease grants the lessee the exclusive rights to mine the coal, subject to the terms and conditions of the lease. Lease ownership is necessary for mining federal coal, but lease ownership does not authorize mining operations. Surface coal mining operations are regulated in accordance with the requirements of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and Wyoming state regulations. SMCRA gives the Office of Surface Mining Reclamation and Enforcement (OSM) primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations.

Pursuant to Section 503 of SMCRA, the WDEQ developed, and in November 1980 the Secretary of the Interior approved, a permanent program authorizing WDEQ to regulate surface coal mining operations and surface effects of underground mining on nonfederal lands within the state of Wyoming. In January 1987, pursuant to Section 523(c) of SMCRA, WDEQ entered into a cooperative agreement with the Secretary of the Interior authorizing WDEQ to regulate surface coal mining operations and surface effects of underground

mining on federal lands within the state. In order to get approval of this cooperative agreement, the state had to demonstrate that the state laws and regulations are no less stringent than, meet the minimum requirements of, and include all applicable provisions of SMCRA.

If the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, or South Porcupine LBA Tracts are leased, they would each be a maintenance lease for the existing applicant mines, which currently have both approved Mineral Leasing Act of 1920 (MLA) mining plans and approved state mining and reclamation permits. In the case of maintenance leases for existing mines, such as the six WAC LBA tracts, the existing MLA mining plans and state mining and reclamation plans must be amended to include any newly leased area before that area can be mined.

In order to amend the existing MLA mining plans and state mining and reclamation permits, the mining companies would be required to submit detailed permit application packages to WDEQ before starting surface coal mining operations on any newly acquired lease(s). WDEQ/Land Quality Division (LQD) would review the respective permit application package to insure the permit application complies with the permitting requirements and the coal mining operation will meet the performance standards of the approved Wyoming program. If the permit application package does comply, WDEQ would issue the applicant an amended permit that would allow the permittee to extend coal mining operations onto the newly acquired lease(s).

Protection of fish, wildlife, and related environmental values is required under SMCRA regulations at 30 CFR 816.97, which state:

> "No surface mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Secretary of which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)."

In addition to requiring the operator to minimize disturbances and adverse impacts on fish, wildlife, and related environmental values, the regulations at 30 CFR 816.97 disallow any surface mining activity which is likely to jeopardize the continued existence of endangered or threatened species and require that the operator use the best technology currently available to: 1) minimize electrocution hazards to raptors; 2) locate and operate haul and access roads to avoid or minimize impacts on important fish and wildlife species; and 3) design fences, conveyors, and other potential barriers to permit passage of large mammals.

U.S. Fish and Wildlife Service (USFWS) Section 7 consultation would be required prior to approval of the mining and reclamation plan modification. Additional measures to ensure compliance with the ESA and SMCRA can be developed when the detailed mining plan, which identifies the actual location of

the disturbance areas, how and when they would be disturbed, and how they would be reclaimed, is developed and reviewed for approval. At the leasing stage, a detailed mining and reclamation plan is not available for evaluation or development of appropriate mitigation measures specific to an actual proposal to mine.

The following is a partial list of measures related to federally-protected species that are required as part of the mining and reclamation permits:

- avoiding bald eagle disturbance per the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act;
- restoring bald eagle foraging areas disturbed by mining;
- using raptor safe power lines; and
- surveying for Ute ladies'-tresses if habitat is present.

## G-3.0 CONSULTATIONS WITH U.S. FISH AND WILDLIFE SERVICE TO DATE

The locations of the existing Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines' coal leases, the existing approved mine permit areas, and the six WAC LBA tracts are shown in Figure G-14. These three applicant mines and six proposed LBA tracts are included in the area determined to be "acceptable for further consideration for leasing" as part of the coal screening process. The coal screening process is a four-part process that includes application of the coal unsuitability criteria, which are defined in 43 CFR 3461.5 and listed in Appendix B of this EIS. BLM and USFS have applied these coal screens to federal coal lands in Campbell County several times, starting in the early 1980s. The six WAC LBA tracts are located in the area covered by the USFS screening analysis published as Appendix F of the 1985 *Thunder Basin National Grassland Land and Resource Management Plan.* Most recently, in 1993, BLM, USFS and the USFWS began the process of reapplying these screens to federal coal lands in Campbell, Converse, and Sheridan counties. The results of this analysis were included as Appendix D of the 2001 *Approved Resource Management Plan for Public Lands Administered by the BLM Buffalo Field Office* (BLM 2001a), which can be viewed on the Wyoming BLM website at http://www.wy.blm.gov in the NEPA documents section. This analysis is referenced in the *Final Environmental Impact Statement (FEIS) for the Northern Great Plains Management Plans Revision* (USFS 2001a) and adopted in the *Land and Resource Management Plan (LRMP) for the Thunder Basin National Grassland* (USFS 2001b). The *Record of Decision for the Thunder Basin National Grassland Final Environmental Impact Statement and Land and Resource Management Plan Revision* was signed on July 31, 2002 (USFS 2002a). The six WAC LBA tracts fall within Management Area 8.4, as identified in the *Thunder Basin National Grassland LRMP*, which is to be managed for mineral production and development. Consultation with USFWS was conducted as part of the *Thunder Basin National Grassland LRMP.* Consultation with USFWS occurred in conjunction with the unsuitability findings under Criterion 9 (Critical Habitat for Threatened or Endangered Plant

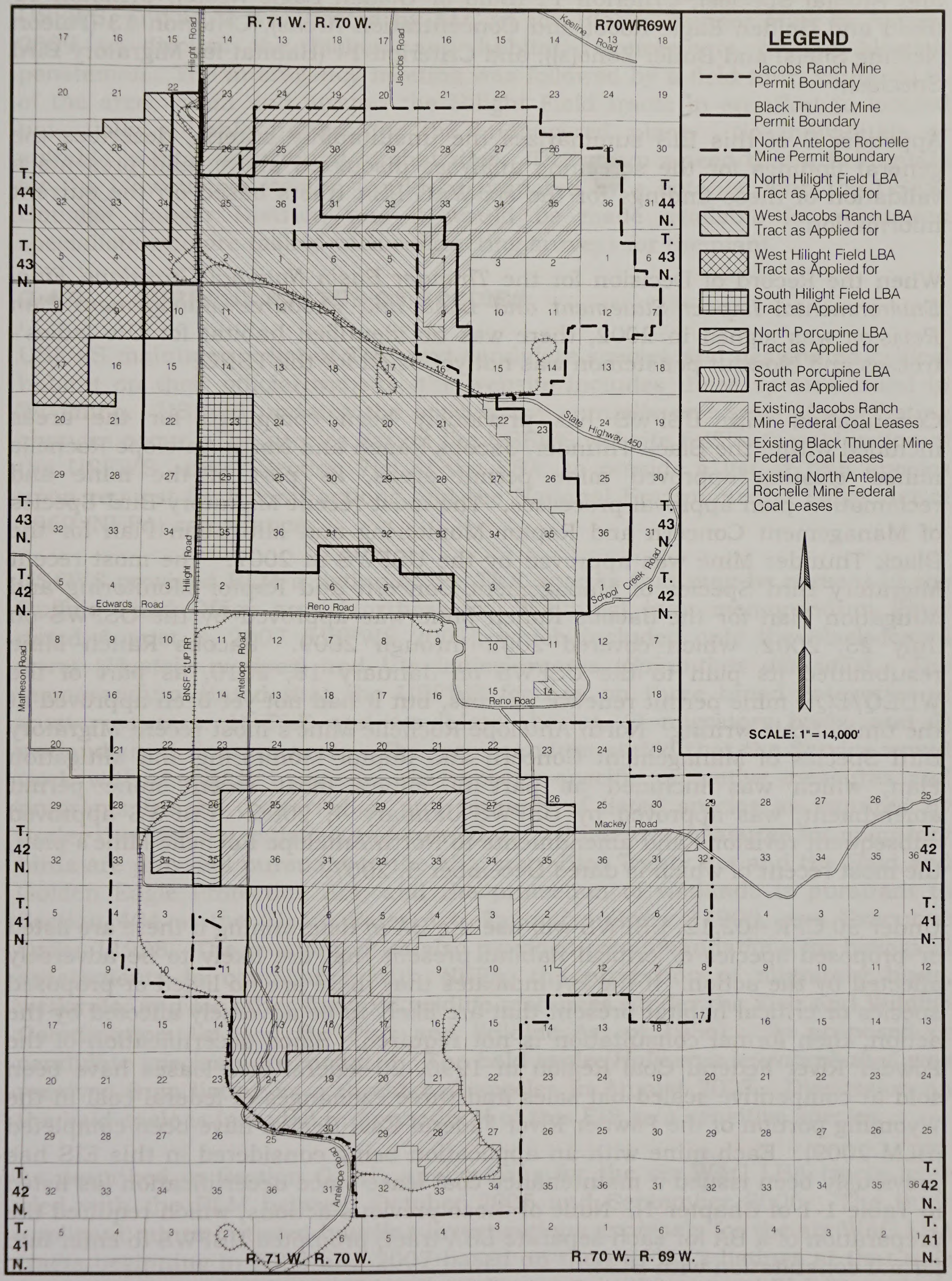


Figure G-14. Black Thunder, Jacobs Ranch, and North Antelope Rochelle Mines' Existing Federal Coal Leases and Permit Boundaries, and the Six WAC LBA Tracts as Applied for.

and Animal Species), Criterion 11 (Bald or Golden Eagle Nests), Criterion 12 (Bald and Golden Eagle Roost and Concentration Areas), Criterion 13 (Falcon Nesting Site(s) and Buffer Zone(s)), and Criterion 14 (Habitat for Migratory Bird Species).

Appendix B of this EIS summarizes the unsuitability criteria, describes the general findings for the screening analyses discussed above, and presents a validation of these findings for the six WAC LBA tracts based on the current information.

When the Record of Decision for the *Thunder Basin National Grassland Final Environmental Impact Statement and Land and Resource Management Plan Revision* was signed in 2002, there was no identified habitat for Ute ladies'-tresses and blowout penstemon was not yet listed for the TBNG.

Consultation with USFWS has previously been completed for the areas included within the Black Thunder, Jacobs Ranch and North Antelope Rochelle mines' existing approved mine permit areas, as part of the mine and reclamation plan approval processes. The most recent Migratory Bird Species of Management Concern and Raptor Monitoring and Mitigation Plan for the Black Thunder Mine was approved by the USFWS in 2007. The most recent Migratory Bird Species of Management Concern and Raptor Monitoring and Mitigation Plan for the Jacobs Ranch Mine was approved by the USFWS on July 25, 2002, which covered 2002 through 2009. Jacobs Ranch Mine resubmitted its plan to the USFWS on January 18, 2010, as part of the WDEQ/LQD mine permit renewal process, but it had not yet been approved at the time of this writing. North Antelope Rochelle Mine's most recent Migratory Bird Species of Management Concern and Raptor Monitoring and Mitigation Plan, which was included as part of mine's most recent mine permit amendment, was approved by USFWS January 4, 2006. USFWS approved subsequent revisions and amendments to North Antelope Rochelle Mine's plan, the most recent of which is dated December 5, 2007.

Under 50 CFR 402.12, USFWS will use the BA in determining if there are listed or proposed species or critical habitat present that are likely to be adversely affected by the action. If the BA indicates that there are no listed or proposed species or critical habitat present that are likely to be adversely affected by the action, then formal consultation is not required. Since decertification of the Powder River Federal Coal Region in 1990, 20 federal coal leases have been sold at competitive sealed-bid sales and three exchanges of federal coal in the Wyoming portion of the Powder River Federal Coal Region have been completed (BLM 2009). Each mine with an application being considered in this EIS has previously been issued a maintenance coal lease since decertification (as listed in Table 1-1 of Chapter 1). None of those previous actions, which required the preparation of a BA for each separate LBA tract, prompted USFWS to enter into formal consultation with BLM.

An informal, 2-day conference between botanists and biologists from the USFS, USFWS, and BLM was hosted by ALC at the Black Thunder Mine in August 2009 to discuss the biology and habitat requirements of the blowout penstemon. The interagency meeting was followed by a field tour, led by ALC, of the area within and around the Hilight Field tracts in an effort to located potentially suitable habitat for the endangered plant. No individuals or suitable habitat were found at that time. The group agreed that a field guide for the blowout penstemon would be prepared by a botanist with the USFS-Douglas Ranger District, and it would be made available for vegetation specialists who are tasked with conducting surveys for the plant.

## G-4.0 CURRENT STATUS OF SPECIES

USFWS maintains a list of T&E and candidate species and designated critical habitat on their official website; the website includes those species found in Wyoming. USFWS updates the species list annually or sooner if any listing changes occur. The species list on the USFWS website fulfills the obligation of the USFWS, under Section 7(c) of the ESA, to provide a list of T&E species upon request for federal actions and the National Environmental Policy Act of 1969 (NEPA) compliance.

USFWS provided BLM a listing of the T&E species that may be present in the Buffalo Field Office area (northeastern Wyoming) in a memorandum letter dated August 8, 2007 (USFWS 2007), which included only the black-footed ferret (*Mustela nigripes*) and Ute ladies'-tresses (*Spiranthes diluvialis*). The memorandum stated that the USFWS focuses on three broad categories of trust resources: 1) T&E and candidate species, 2) migratory birds, and 3) wetlands and riparian areas. The memorandum stated that the Service would work with the BLM to ensure that species-specific protective measures and programs for the conservation and recovery of listed species as required by under the ESA are satisfied and carried out. Protective measures for migratory birds are provided pursuant to the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, and the protection of wetlands is pursuant to Section 404 of the Clean Water Act, Executive Order 11990, and Executive Order 11988. The memorandum also provided recommendations for biological assessments in compliance with NEPA, the protection of migratory birds, wetlands, and for other fish and wildlife resources (under the Fish and Wildlife Coordination Act and the Fish and Wildlife Act of 1956). No proposed or candidate species were included. The bald eagle (*Haliaetus leucocephalus*) was removed from listing as a threatened species in August 2007. Discussion on the bald eagle is included in Appendix H of this EIS as a sensitive species.

As described in Section G-1.1, applications for the six WAC LBA tracts were filed with the BLM between October 2005 and September 2006. The three applicant mines initiated baseline investigations expressly for the six WAC LBA tracts beginning in 2006 and 2007 based on the USFWS's listings at that time for the T&E species that could potentially occur in the general Wright analysis area (black-footed ferret and Ute ladies'-tresses). In 2008 the USFWS began to

post listings of T&E and candidate species for all counties in Wyoming on their website (http://www.fws.gov/mountain-prairie/endspp/CountyLists/Wyoming.pdf). The February 2008 USFWS listing for Campbell County included the black-footed ferret, Ute ladies'-tresses, and an additional species, the blowout penstemon (*Penstemon haydenii*) (USFWS 2008). The USFWS supplies a specific list of T&E and candidate species to the USFS Thunder Basin National Grassland (TBNG) each year for use in project planning. The TBNG list provided to USFS in 2008 (Kelly 2008) concurred with the February 2008 listing for Campbell County. The BA included in the WAC Lease Applications Draft EIS, which was made available for public inspection in June 2009, as prepared according to these 2008 USFWS listings of three federally listed species that could potentially occur in the general Wright analysis area:

- Ute ladies'-tresses orchid (*Spiranthes diluvialis*): Threatened
- Black-footed ferret (*Mustela nigripes*): Endangered
- Blowout penstemon (*Penstemon haydenii*): Endangered

In a memorandum letter to BLM dated May 22, 2009 (USFWS 2009a), USFWS provided an updated listing of the T&E species that may be present in the Buffalo Field Office area, which included the Ute ladies'-tresses and blowout penstemon, but did not include the black-footed ferret. In a similar letter from the USFWS to the USFS Douglas Ranger District dated May 22, 2009, which listed the T&E species that may occur within the TBNG, only the Ute ladies'-tresses and blowout penstemon were included (USFWS 2009b). In addition, the USFWS's website listing of T&E species that may be present in Campbell County was updated August, 2009 (USFWS 2009c), and it concurs with the May 22, 2009 letters from the USFWS to the BLM Buffalo Field Office and the USFS Douglas Ranger District listing the T&E species that could potentially occur in the general Wright analysis area. Therefore, according to the current USFWS information (USFWS 2009a, 2009b, and 2009c), two federally listed species could potentially occur in the general Wright analysis area:

- Ute ladies'-tresses orchid (*Spiranthes diluvialis*): Threatened
- Blowout penstemon (*Penstemon haydenii*): Endangered

As stated above, the BA included in the WAC Lease Applications Draft EIS addressed the Ute ladies'-tresses, blowout penstemon, and black-footed ferret. Rather than remove those sections that describe the biology and habitat requirements and potential impacts of the Proposed Actions and alternatives on the black-footed ferret because the animal is no longer listed by the USFWS as potentially occurring in the general Wright analysis area, BLM has elected to keep those sections intact and address all three species in the Final EIS (this document).

Since 1999, the USFWS has received eight petitions requesting that the greater sage-grouse (*Centrocercus urophasianus*) be listed under the ESA as threatened or endangered. Three of the petitions requested that sage-grouse be listed as endangered across its entire range. On January 12, 2005, following a 12-

month status review on the species, the USFWS concluded that listing was not warranted at that time. On December 4, 2007, U.S. District Court, District of Idaho, ruled that the USFWS 12-month petition finding on sage-grouse was in error and remanded the case back to the USFWS for further reconsideration. On February 26, 2008, the USFWS announced the initiation of another status review for the sage-grouse. The USFWS announced on March 5, 2010 its decision to classify the sage-grouse as a candidate species under the ESA. The USFWS found that listing the sage-grouse (rangewide) was warranted, but precluded by the need to address higher priority species first.

Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them for listing as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing actions to address species in greater need. Candidate species receive no statutory protection under the ESA, but the USFWS encourages voluntary cooperative conservation efforts for these species because they are, by definition, species that warrant future protection under the ESA (USFWS 2010).

USFWS has indicated the need for continued efforts to conserve sage-grouse and sagebrush habitat on a long-term basis, and has encouraged continued development and implementation of conservation strategies throughout the species' range. While it is not required that BLM consult or confer with USFWS on Candidate species, the BLM may seek technical assistance from the USFWS when it is determined to be advantageous to a species' conservation or BLM management options. The greater sage-grouse is currently listed as a BLM Sensitive Species and a USFS Region 2 Sensitive Species and Management Indicator Species, and as such, is included in the Biological Evaluation for this EIS (Appendix H).

The Wyoming Game and Fish Department (WGFD) provided BLM with scoping comments for the six WAC LBA tracts in a letter dated July 5, 2007 (WGFD 2007). WGFD recommended consideration be given to possible impacts to big game species and their habitat, sage-grouse, other sagebrush obligates, and nongame species that occur within the general Wright analysis area.

## G-5.0 METHODS

All available information pertaining to the species included in this analysis were reviewed and incorporated by reference. The assessments and recommendations contained within this BA are based upon information obtained from several sources including published literature, unpublished documents, personal communications with state and federal agency wildlife specialists, and field surveys.

### G-5.1 Published Literature

Published scientific documents that pertain directly to the species included in this analysis were reviewed and incorporated into this BA. Background information on the wildlife, vegetation and T&E species in the vicinity of the general Wright analysis area was also obtained from other PRB coal leasing EIS documents (e.g., the 2003 South Powder River Basin Coal FEIS and the 2008 West Antelope II Coal Lease Application FEIS). All published literature used in the preparation of this BA is appropriately cited.

### G-5.2 Unpublished Documents

Unpublished documents and records from the Wyoming Game and Fish Department (WGFD), BLM, USFWS, and USFS were reviewed, as were survey guidelines for the T&E species that are included in this analysis. The Wyoming Natural Diversity Database (WYNDD) was queried for reports of these species within the general Wright analysis area. WDEQ/LQD mine permit applications, which include the baseline surveys and inventories, and annual wildlife monitoring reports for the applicant and the neighboring (i.e., Antelope Mine) mines, which are all on file with the WDEQ/LQD in Cheyenne and Sheridan, Wyoming, were also reviewed.

### G-5.3 Personal Communications

Professional wildlife biologists, botanists and rangeland management specialists contracted to conduct baseline surveys and annual monitoring by the applicant mines, as well as the neighboring mines, have been in personal contact with their counterparts and other personnel from the WGFD, BLM, USFWS, USFS, and the WYNDD since the mines were initially permitted.

### G-5.4 Field Surveys

Wildlife baseline inventories and annual monitoring surveys have been conducted for the Black Thunder Mine since 1983, the Jacobs Ranch Mine since 1980, and the North Antelope Rochelle Mine since 1984. These wildlife monitoring programs were designed to meet the WDEQ/LQD, WGFD, and federal (USFWS) requirements for annual monitoring and reporting of wildlife activity on coal mining areas. Detailed procedures and site-specific requirements have been carried out as approved by WGFD and USFWS. The annual wildlife monitoring program have been consistent and in accordance with Appendix B of WDEQ/LQD Coal Rules and Regulations. Areas covered by the wildlife surveys have included the mine's permit area and a large perimeter around the permit boundary. Vegetation and soils baseline surveys covering the mine permit areas have also been conducted for the three applicant mines since they were initially permitted.

### G-5.4.1 North Hilight Field Tract

The North Hilight Field LBA Tract has received extensive coverage during baseline and annual wildlife monitoring surveys for both the Black Thunder and Jacobs Ranch mines for over 25 years. All but the northern quarter of the tract as applied for has been included in Black Thunder Mine's annual surveys since 2002.

The Black Thunder Mine initiated baseline wildlife investigations expressly for the North Hilight Field LBA Tract in 2006, with annual monitoring continued in subsequent years. All or portions of the tract's associated general analysis area (described in Section G-1.1), plus the additional "wildlife survey area" (described as a 2-mile perimeter beyond the LBA tract's general analysis area) was included in these wildlife monitoring areas at the Black Thunder Mine and/or the neighboring Jacobs Ranch Mine. Black Thunder Mine initiated targeted surveys specifically for the West Hilight Field LBA Tract and its wildlife survey area in 2006 and 2007. Additional survey areas focusing on the North and South Hilight Field LBA Tracts were added in 2007 and 2008. Figure G-15 depicts the North Hilight Field LBA Tract, the tract's general analysis area, and the T&E animal species survey area.

Details concerning the field surveys that were conducted for the T&E plant species (Ute ladies'-tresses and blowout penstemon), which covered the LBA tract's general analysis area, are discussed below in Section 7.0.

### G-5.4.2 South Hilight Field Tract

The South Hilight Field LBA Tract has received extensive coverage during baseline and annual wildlife monitoring surveys for the Black Thunder Mine for over 25 years. All but approximately 160 acres located in the southwestern corner of BLM's study area for the South Hilight Field tract has been included in baseline inventories and annual wildlife surveys conducted for the mine since 1983.

Black Thunder Mine initiated targeted surveys specifically for the West Hilight Field LBA Tract and its wildlife survey area in 2006 and 2007. Additional surveys focusing on the wildlife survey areas for the North and South Hilight Field LBA Tracts were added in 2007 and 2008. Figure G-16 depicts the South Hilight Field LBA Tract, the tract's general analysis area, and the T&E animal species survey area.

Details concerning the field surveys that were conducted for the T&E plant species (Ute ladies'-tresses and blowout penstemon), which covered the LBA tract's general analysis area, are discussed below in Section 7.0.

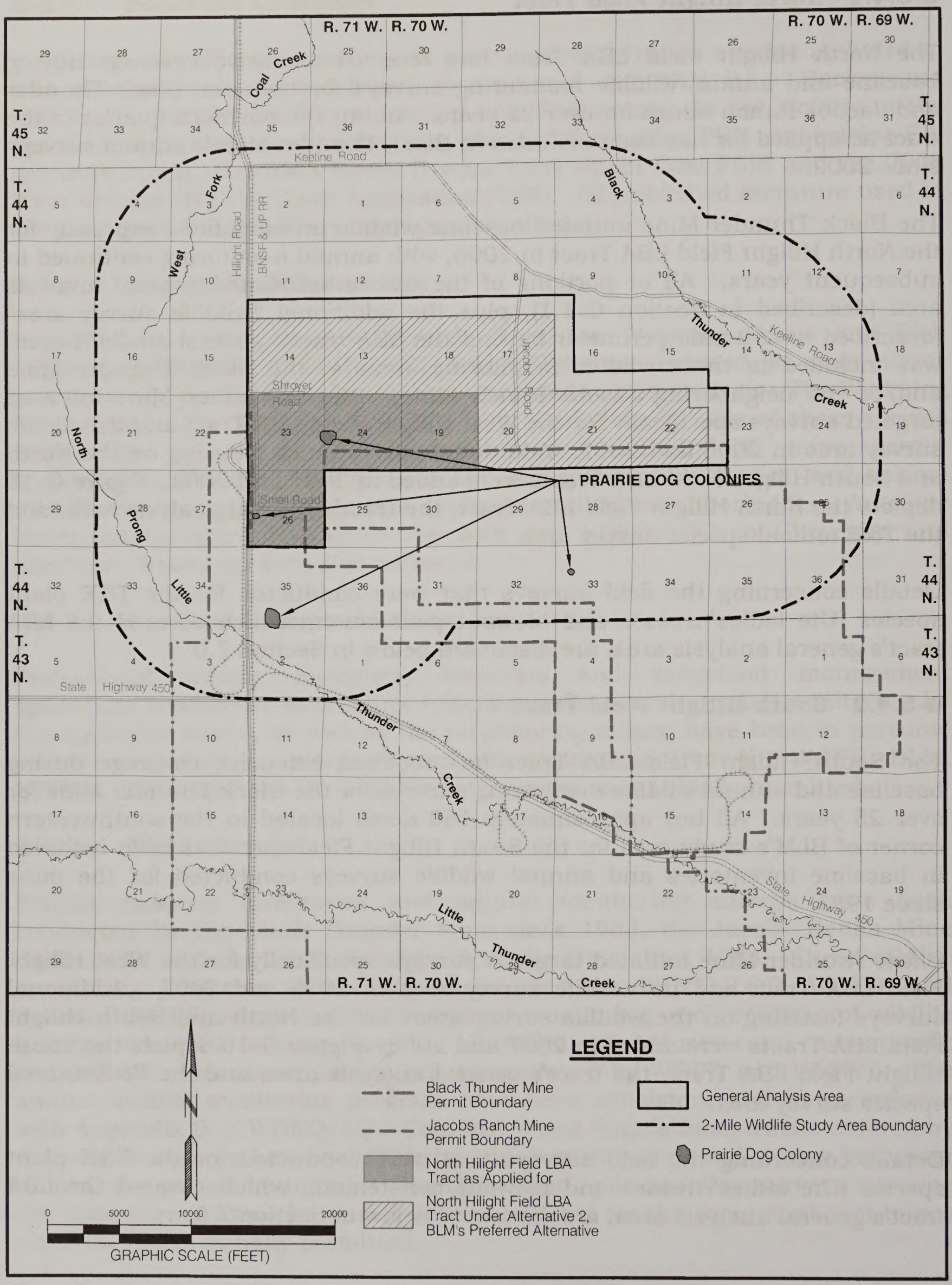


Figure G-15. T&E Species Survey Area for the North Hilight Field LBA Tract.

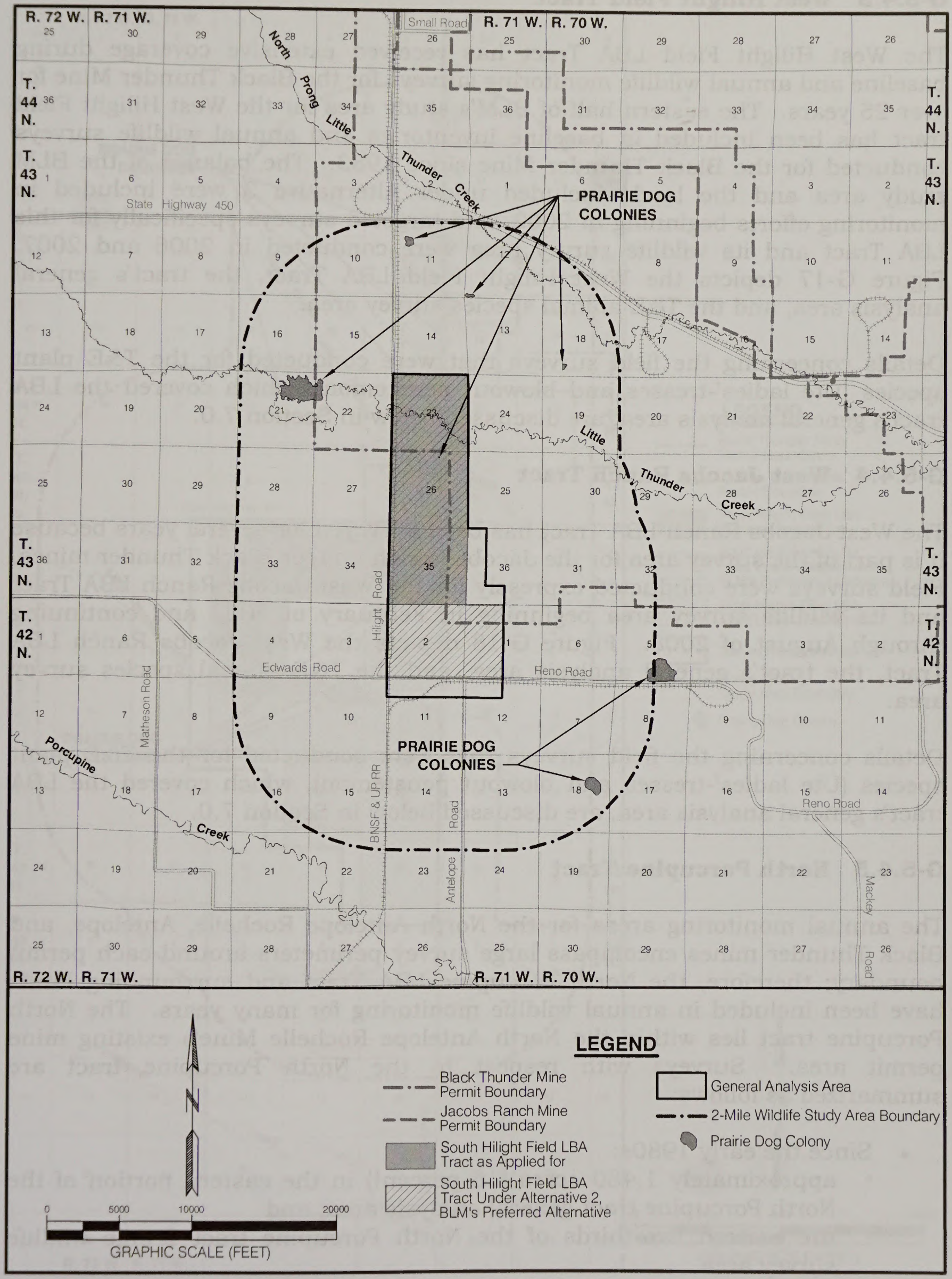


Figure G-16. T&E Species Survey Area for the South Hilight Field LBA Tract.

### G-5.4.3 West Hilight Field Tract

The West Hilight Field LBA Tract has received extensive coverage during baseline and annual wildlife monitoring surveys for the Black Thunder Mine for over 25 years. The eastern half of BLM's study area for the West Hilight Field tract has been included in baseline inventories and annual wildlife surveys conducted for the Black Thunder Mine since 1983. The balance of the BLM study area and the lands included under Alternative 3 were included in monitoring efforts beginning in 2002, and targeted surveys specifically for this LBA Tract and its wildlife survey area were conducted in 2006 and 2007. Figure G-17 depicts the West Hilight Field LBA Tract, the tract's general analysis area, and the T&E animal species survey area.

Details concerning the field surveys that were conducted for the T&E plant species (Ute ladies'-tresses and blowout penstemon), which covered the LBA tract's general analysis area, are discussed below in Section 7.0.

### G-5.4.4 West Jacobs Ranch Tract

The West Jacobs Ranch LBA Tract has been surveyed for several years because it is part of the survey area for the Jacobs Ranch and/or Black Thunder mines. Field surveys were conducted expressly for the West Jacobs Ranch LBA Tract and its wildlife survey area beginning in February of 2007 and continuing through August of 2008. Figure G-18 depicts the West Jacobs Ranch LBA Tract, the tract's general analysis area, and the T&E animal species survey area.

Details concerning the field surveys that were conducted for the T&E plant species (Ute ladies'-tresses and blowout penstemon), which covered the LBA tract's general analysis area, are discussed below in Section 7.0.

### G-5.4.5 North Porcupine Tract

The annual monitoring areas for the North Antelope Rochelle, Antelope, and Black Thunder mines encompass large survey perimeters around each permit boundary; therefore, the North Porcupine LBA Tract and surrounding lands have been included in annual wildlife monitoring for many years. The North Porcupine tract lies within the North Antelope Rochelle Mine's existing mine permit area. Surveys with respect to the North Porcupine tract are summarized as follows:

- Since the early 1980s:
  - approximately 1,480 acres (16 percent) in the eastern portion of the North Porcupine tract general analysis area; and
  - the eastern two-thirds of the North Porcupine tract 2-mile wildlife survey area.

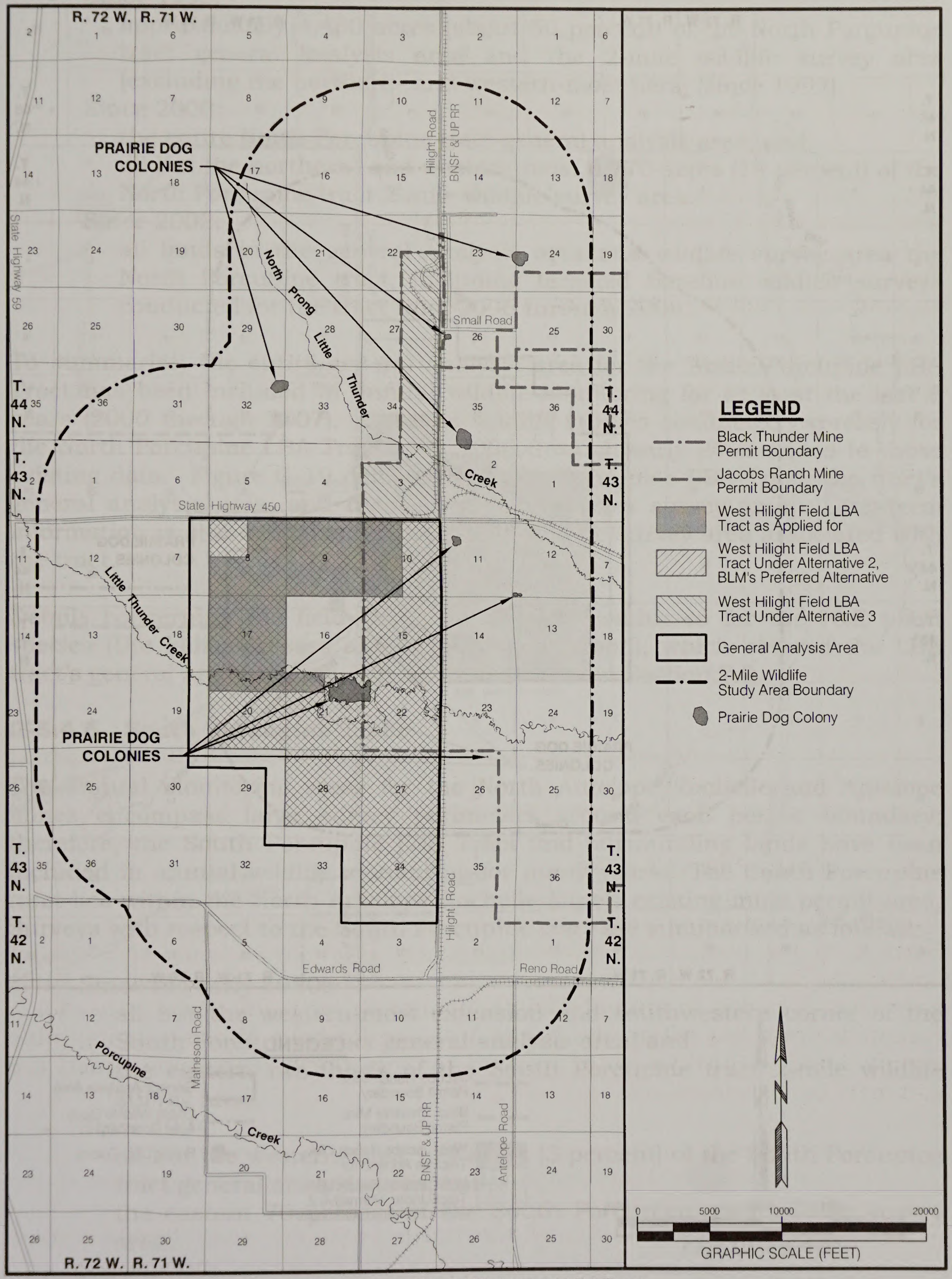


Figure G-17. T&E Species Survey Area for the West Hilight Field LBA Tract.

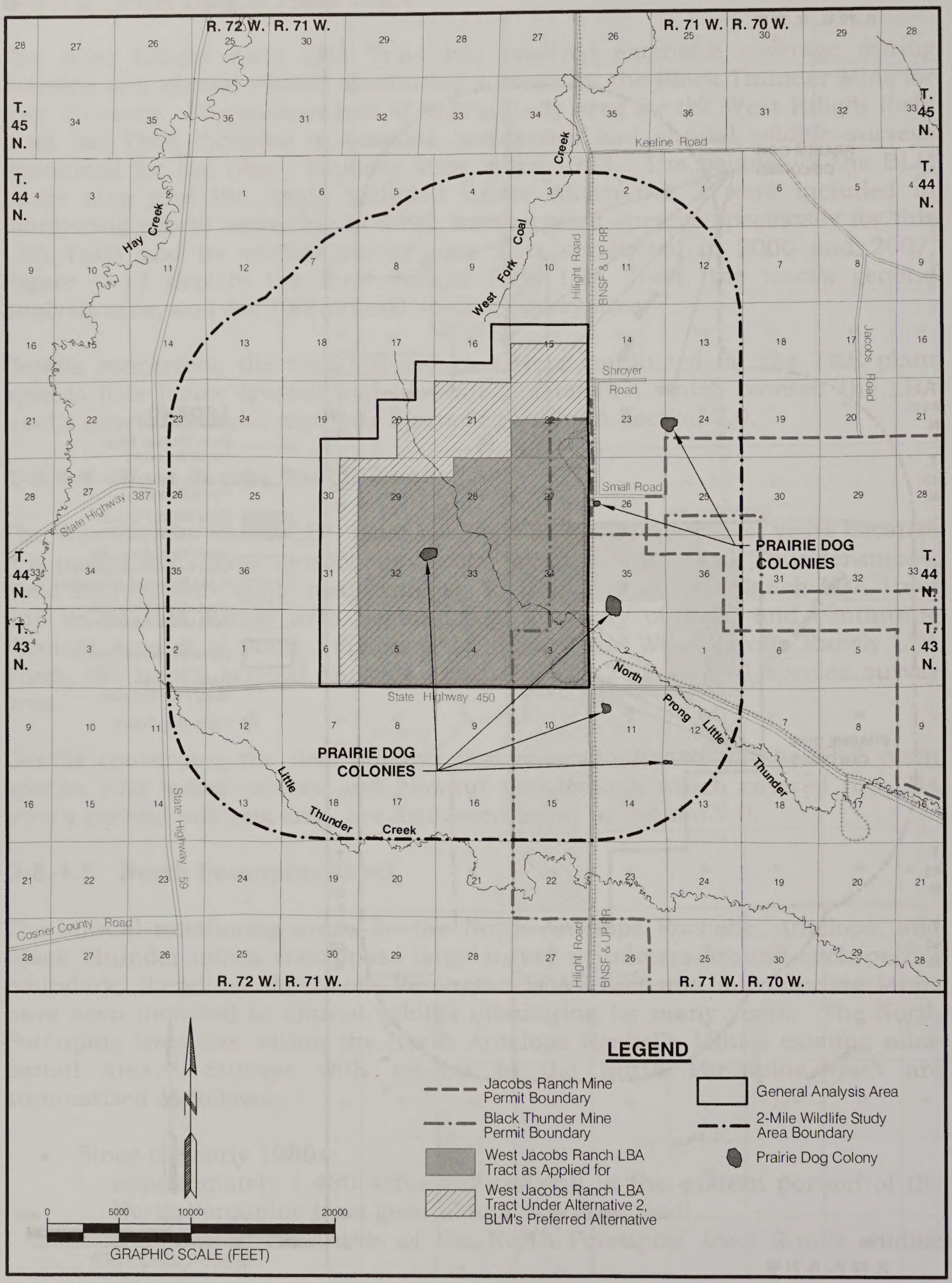


Figure G-18. T&E Species Survey Area for the West Jacobs Ranch LBA Tract.

- Since 1992:
  - approximately 4,480 acres (about 50 percent) of the North Porcupine tract general analysis area and the 2-mile wildlife survey area (excluding the northern- and western-most tiers) (since 1992).
- Since 2000:
  - the entire North Porcupine tract general analysis area; and
  - all but the northern- and western-most 6,770 acres (14 percent) of the North Porcupine tract 2-mile wildlife survey area.
- Since 2002:
  - all lands in the general analysis area and wildlife survey area the North Porcupine tract, including targeted baseline wildlife surveys conducted for the tract from 2006 through 2008.

To summarize, the entire general analysis area for the North Porcupine LBA Tract has been included in annual wildlife monitoring for at least the last 8 years (2000 through 2007). Baseline wildlife studies conducted expressly for the North Porcupine LBA Tract from 2006 through early 2008 added to those existing data. Figure G-19 depicts the North Porcupine LBA Tract, the tract's general analysis area, and the T&E animal species survey area. Long-term information is also available for the 2-mile wildlife survey area associated with the tract.

Details concerning the field surveys that were conducted for the T&E plant species (Ute ladies'-tresses and blowout penstemon), which covered the LBA tract's general analysis area, are discussed below in Section 7.0.

### G-5.4.6 South Porcupine Tract

The annual monitoring areas for the North Antelope Rochelle and Antelope mines encompass large survey perimeters around each permit boundary; therefore, the South Porcupine LBA Tract and surrounding lands have been included in annual wildlife monitoring for many years. The South Porcupine tract lies within the North Antelope Rochelle Mine's existing mine permit area. Surveys with respect to the South Porcupine tract are summarized as follows:

- Since the early 1980s:
  - all but the western-most extension and southwestern corner of the South Porcupine tract general analysis area; and
  - the eastern two-thirds of the South Porcupine tract 2-mile wildlife survey area.
- Since 1994:
  - all but the western-most 114 acres (3 percent) of the South Porcupine tract general analysis area; and;
  - the eastern 70 percent of the South Porcupine tract wildlife survey area.
- Since 2000:
  - the entire South Porcupine tract general analysis area; and

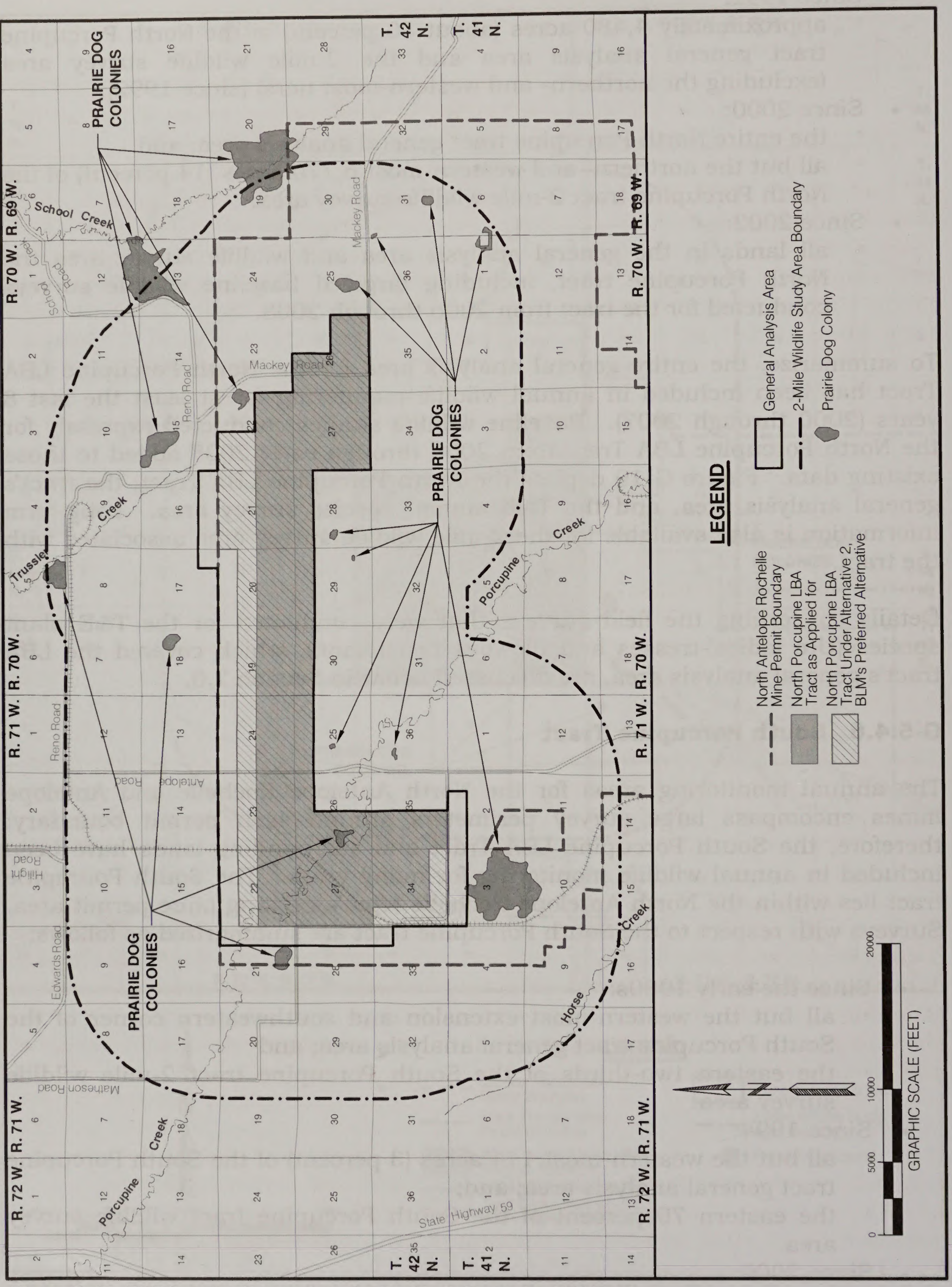


Figure G-19. T&E Species Survey Area for the North Porcupine LBA Tract.

- all but 2,216 acres (8 percent) at the west-central edge of the South Porcupine tract wildlife survey area.
- Since 2002:
  - all lands in the general analysis area and wildlife survey area the South Porcupine tract, including targeted baseline wildlife surveys conducted for the tract from 2006 through 2008.

To summarize, the entire general analysis area for the South Porcupine LBA Tract has been included in annual wildlife monitoring for at least the last eight years (2000 through 2007), and 97 percent of the tract's general analysis area was monitored annually from 1994 through 2000. Baseline wildlife studies conducted expressly for the South Porcupine LBA Tract from 2006 through early 2008 added to those existing data. Figure G-20 depicts the South Porcupine LBA Tract, the tract's general analysis area, and the T&E animal species survey area. Long-term information is also available for the 2-mile wildlife survey area associated with the tract.

Details concerning the field surveys that were conducted for the T&E plant species (Ute ladies'-tresses and blowout penstemon), which covered the LBA tract's general analysis area, are discussed below in Section 7.0.

## G-6.0 CURRENT HABITAT DESCRIPTIONS

Predominant wildlife habitat types classified in the general Wright analysis area generally correspond with the major vegetation communities defined during the vegetation baseline survey. In terms of relative acres of occurrence, the predominant vegetation types are the Big Sage Shrubland (approximately 42 percent), Upland/Mixed Prairie Grassland (approximately 28 percent), and Crested Wheatgrass/Agricultural Pastureland (approximately 15 percent). Minor vegetation types, including saline grassland, rough breaks, disturbed lands and bottomlands account for approximately 10 percent of the six combined general analysis areas. Disturbed lands include road and utility rights-of-way, areas surrounding active construction sites and mining facilities, oil and gas facilities, and occupied and abandoned homesteads. Few trees occur in the general Wright analysis area due to the lack of water and suitable habitats; most trees are found primarily in windbreaks planted adjacent to ranching facilities. Reclaimed lands include areas that were recently disturbed for road construction, installation of oil and gas development-related facilities, and mining-associated activities.

Numerous in-channel stock reservoirs are scattered throughout the general Wright analysis area. Most of these stock ponds are many decades old and are constructed with earthen berms or dams. There are also a number of playas within the area. Those water bodies provide short-term habitat of variable quality for migrating waterfowl, shorebirds, and other aquatic species (birds, fish, herptiles) during spring but are less reliable, and often dry, during other seasons.

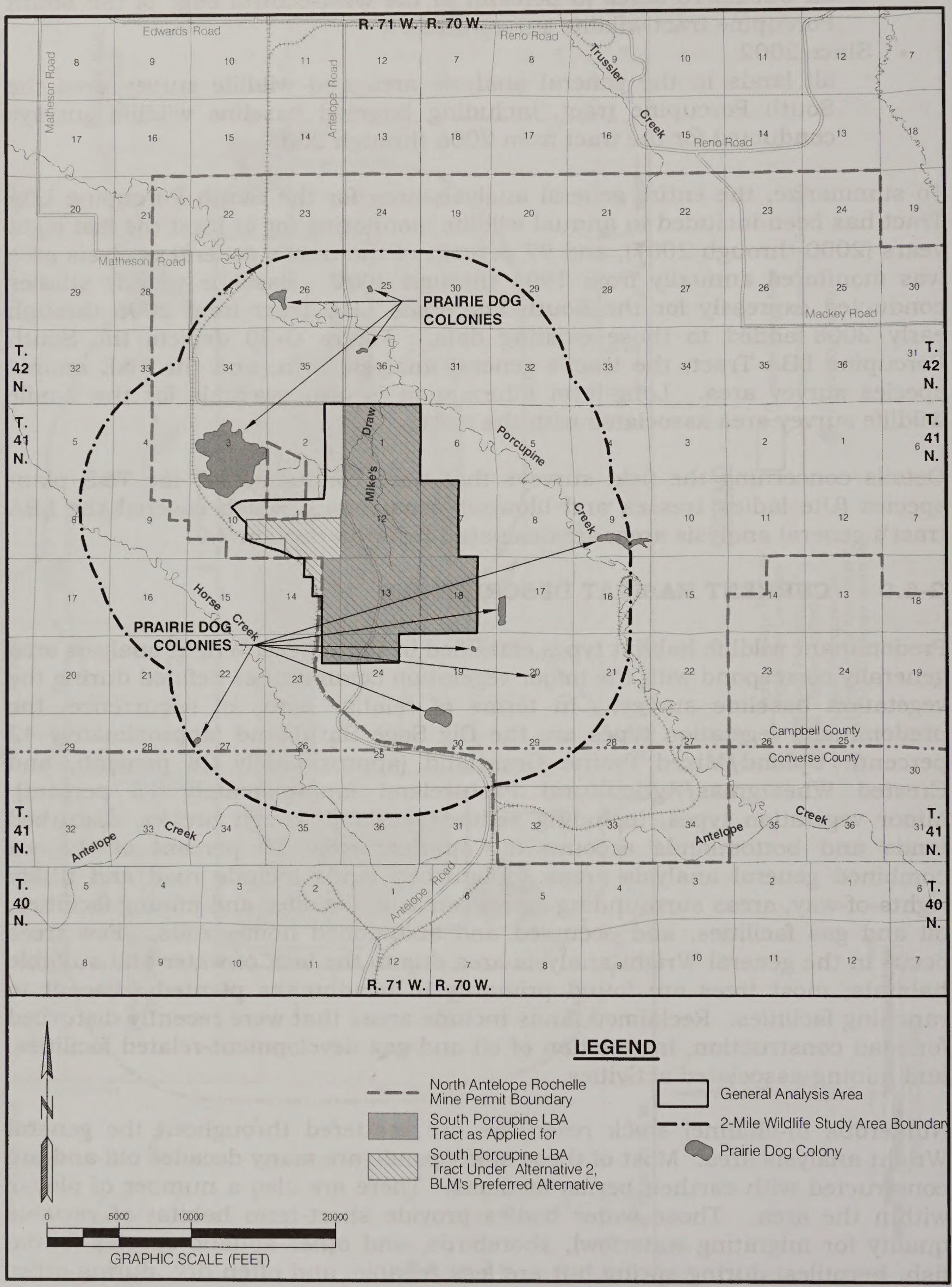


Figure G-20. T&E Species Survey Area for the South Porcupine LBA Tract.

The landscape of the general Wright analysis area consists primarily of gently rolling terrain broken by minor drainages and internally-drained playa areas. Drainage densities are quite low, and the playas are common topographic and hydrologic features. Much of the land surface does not contribute runoff to any stream, and playas have formed in the lowest portion of these non-contributing drainage areas. Land surface elevations range from about 4,690 to 5,170 feet above sea level and slopes range from essentially flat to over 50 percent within the general Wright analysis area. Gently rolling uplands (ground elevated above the lowlands that lie along the banks of drainages) comprise most of the general Wright analysis area; most of the land surface (between 75 and 90 percent, depending on the particular LBA tract) seldom exceeds a 5 percent slope. The steepest slopes typically occur near the highest elevations along the ridge lines and drainage divides and along the drainages, where channel incision has created some gullying.

## G-6.1 North Hilight Field Tract

The North Hilight Field Tract LBA Tract and adjacent areas consist primarily of uplands. The topography of the tract's general analysis area, like the areas within the adjacent mines' existing permit areas, is relatively subdued. The average land surface slope over the entire general analysis area for the North Hilight Field tract is approximately 3.4 percent. Surface mine lands, both disturbed and reclaimed, dominate the landscape south and east of the North Hilight Field tract.

The North Hilight Field tract's general analysis area and the existing Black Thunder Mine permit area are located in the Little Thunder Creek watershed. Typical of this semi-arid area, Little Thunder Creek and its tributaries are all ephemeral streams. Black Thunder Mine's approved WDEQ/LQD mine permit allows disturbance of Little Thunder Creek and several of its tributaries, including North Prong Little Thunder Creek. Approximately 43 percent (3,031 acres) of the 7,139-acre BLM study area for the North Hilight Field tract drains toward playas that are formed by natural topographic depressions; the largest of which are the Hansen Lakes; and Springen Draw, an internally drained closed basin, drains the entire western portion of the tract's general analysis area.

A preliminary wetland inventory of the general analysis area for the North Hilight Field LBA Tract, based on USFWS National Wetland Inventory (NWI) mapping (1980), review of color infrared aerial photographs (WGCS 2002), and a field survey reconnaissance, was conducted in 2007. Some wetland areas previously mapped by the USFWS NWI have been recently altered due to coal bed natural gas (CBNG)-related water production within and upstream of the tract's general analysis area. The NWI maps were consulted prior to the initiation of the preliminary wetland field survey; however, the boundaries of the existing potential wetlands vary to a greater or lesser extent from the boundaries shown on the NWI maps. Due to the ephemeral nature of natural surface water features and CBNG dewatering activities, the boundaries, areas,

and types of wetlands are likewise ephemeral. A formal jurisdictional wetland delineation survey for the North Hilight Field LBA Tract would be conducted and submitted to the U.S. Army Corps of Engineers (COE) for verification as part of the mine permitting process, if the LBA tract is leased.

Within the entire general analysis area for the North Hilight Field LBA Tract (8,476.4 acres), the preliminary wetland inventory identified a total of 177.5 acres of wetlands and other waters of the U.S. (OWUS). These wetlands and OWUS were found within five general land categories: ephemeral streams, playas, ponds/reservoirs, isolated depressions, and excavated upland areas. These 177.5 acres are vegetated wetlands that consist of approximately 172.0 acres of palustrine emergent herbaceous wet meadow or marsh and approximately 5.5 acres of palustrine aquatic beds located along ephemeral stream channels and around ponds, playas and depressions. No areas of open water (pond or channel OWUS) were observed during this preliminary wetland inventory.

At this time, a distinction has not been made between jurisdictional and non-jurisdictional acreages of wetlands and OWUS since only the COE has the authorization to make such determination following the submittal and review of a formal wetland delineation as part of the mine permitting process. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate the replacement of at least equal types and numbers of jurisdictional wetland acreages.

Within the general analysis area for the North Hilight Field LBA Tract, no designated critical, crucial, or unique habitats designated by USFWS for T&E species are present.

### G-6.2 South Hilight Field Tract

The South Hilight Field Tract LBA Tract and adjacent areas consist primarily of uplands (i.e., ground elevated above the lowlands that lie along the banks of drainages). The topography of the tract's general analysis area, like the areas within the adjacent mines' existing permit areas, is relatively subdued. The average land surface slope over the entire general analysis area for the South Hilight Field tract is approximately 2.5 percent. Surface mine lands, both disturbed and reclaimed, dominate the landscape northeast, east, and southeast of the South Hilight Field tract.

The South Hilight Field tract's general analysis area and the existing Black Thunder Mine permit area are located in the Little Thunder Creek watershed. Typical of this semi-arid area, Little Thunder Creek and its tributaries are all ephemeral streams. Little Thunder Creek flows easterly through and drains the northern portion of the BLM study area for the South Hilight Field LBA Tract. Approximately 47 percent (1,364 acres) of the 2,922-acre BLM study area for the South Hilight Field tract drains toward playas that are formed by

natural topographic depressions. The southwestern corner of the tract's general analysis area is drained by Briggs Draw, an ephemeral tributary of Little Thunder Creek. Black Thunder Mine's approved WDEQ/LQD mine permit allows disturbance of Little Thunder Creek and several of its tributaries.

A preliminary wetland inventory of the general analysis area for the South Hilight Field LBA Tract, based on USFWS NWI mapping (1980), review of color infrared aerial photographs (WGCS 2002), and a field survey reconnaissance, was conducted in 2007. Some wetland areas previously mapped by the USFWS NWI have been recently altered due to CBNG-related water production within and upstream of the tract's general analysis area. The NWI maps were consulted prior to the initiation of the preliminary wetland field survey; however, the boundaries of the existing potential wetlands vary to a greater or lesser extent from the boundaries shown on the NWI maps. Due to the ephemeral nature of natural surface water features and CBNG dewatering activities, the boundaries, areas, and types of wetlands are likewise ephemeral. A formal jurisdictional wetland delineation survey for the South Hilight Field LBA Tract would be conducted and submitted to the COE for verification as part of the mine permitting process, if the LBA tract is leased.

Within the entire general analysis area for the South Hilight Field LBA Tract (3,367.9 acres), the preliminary wetland inventory identified a total of 55.1 acres of wetlands and OWUS. These wetlands and OWUS were found within five general land categories: ephemeral streams, playas, ponds/reservoirs, isolated depressions, and excavated upland areas. Of these 55.1 acres, approximately 52.3 acres are vegetated wetlands that consist of approximately 51.2 acres of palustrine emergent herbaceous wet meadow or marsh and approximately 1.1 acres of palustrine aquatic beds located along ephemeral stream channels and around ponds, playas and depressions. The remaining 2.8 acres are channel OWUS (open water in Little Thunder Creek). Little Thunder Creek was initially classified as a palustrine wetland by NWI, but currently meets the classification of a riverine, streambed system and is heavily influenced by CBNG discharge water.

At this time, a distinction has not been made between jurisdictional and non-jurisdictional acreages of wetlands and OWUS since only the COE has the authorization to make such determination following the submittal and review of a formal wetland delineation as part of the mine permitting process. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate the replacement of at least equal types and numbers of jurisdictional wetland acreages.

Within the general analysis area for the South Hilight Field LBA Tract, no designated critical, crucial, or unique habitats designated by USFWS for T&E species are present.

## G-6.3 West Hilight Field Tract

The West Hilight Field Tract LBA Tract and adjacent areas consist primarily of uplands (i.e., ground elevated above the lowlands that lie along the banks of drainages). The topography of the tract's general analysis area, like the areas within the adjacent mines' existing permit areas, is relatively subdued. The average land surface slope over the entire general analysis area for the West Hilight Field tract is approximately 2.2 percent. Surface mine lands, both disturbed and reclaimed, dominate the landscape northeast, east and southeast of the West Hilight Field tract.

The West Hilight Field tract's general analysis area and the existing Black Thunder Mine permit area are located in the Little Thunder Creek watershed. Typical of this semi-arid area, Little Thunder Creek and its tributaries are all ephemeral streams. Black Thunder Mine's approved WDEQ/LQD mine permit allows disturbance of Little Thunder Creek and several of its tributaries. Approximately 24 percent (1,708 acres) of the 9,189-acre BLM study area for the West Hilight Field tract drains toward playas that are formed by natural topographic depressions; the largest of which is called Rochelle Lake. Most of the internally-drained areas located within the West Hilight Field general analysis area occur north of Little Thunder Creek. Little Thunder Creek flows easterly through the central portion of the West Hilight Field general analysis area, and its ephemeral tributaries, Briggs Draw and Black Butte Draw, drain the southern portion of the general analysis area.

A preliminary wetland inventory of the general analysis area for the West Hilight Field LBA Tract, based on USFWS NWI mapping (1980), review of color infrared aerial photographs (WGCS 2002), and a field survey reconnaissance, was conducted in 2007. Some wetland areas previously mapped by the USFWS NWI have been recently altered due to CBNG-related water production within and upstream of the tract's general analysis area. The NWI maps were consulted prior to the initiation of the preliminary wetland field survey; however, the boundaries of the existing potential wetlands vary to a greater or lesser extent from the boundaries shown on the NWI maps. Due to the ephemeral nature of natural surface water features and CBNG dewatering activities, the boundaries, areas, and types of wetlands are likewise ephemeral. A formal jurisdictional wetland delineation survey for the West Hilight Field LBA Tract would be conducted and submitted to the COE for verification as part of the mine permitting process, if the LBA tract is leased.

Within the entire general analysis area for the West Hilight Field LBA Tract (9,188.6 acres), the preliminary wetland inventory identified a total of 262.7 acres of wetlands and OWUS. These wetlands and OWUS were found within five general land categories: ephemeral streams, playas, ponds/reservoirs, isolated depressions, and excavated upland areas. Of these 262.7 acres, approximately 252.8 acres are vegetated wetlands that consist of approximately 240.6 acres of palustrine emergent herbaceous wet meadow or marsh and approximately 12.2 acres of palustrine aquatic beds located along ephemeral

stream channels and around ponds, playas and depressions. The remaining 9.9 acres are channel and pond OWUS (open water in Little Thunder Creek and Little Thunder Reservoir). Little Thunder Creek was initially classified as a palustrine wetland by NWI, but currently meets the classification of a riverine, streambed system and is heavily influenced by CBNG discharge water.

At this time, a distinction has not been made between jurisdictional and non-jurisdictional acreages of wetlands and OWUS since only the COE has the authorization to make such determination following the submittal and review of a formal wetland delineation as part of the mine permitting process. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate the replacement of at least equal types and numbers of jurisdictional wetland acreages.

Within the general analysis area for the West Hilight Field LBA Tract, no designated critical, crucial, or unique habitats designated by USFWS for T&E species are present.

### G-6.4 West Jacobs Ranch Tract

The West Jacobs Ranch LBA Tract and adjacent areas consist primarily of uplands (i.e., ground elevated above the lowlands that lie along the banks of drainages). The topography of the tract's general analysis area, like the areas within the adjacent mines' existing permit areas, is relatively subdued. The average land surface slope over the entire general analysis area for the West Jacobs Ranch tract is approximately 4.1 percent. Surface mine lands, both disturbed and reclaimed, dominate the landscape east of the West Jacobs Ranch tract.

Predominant wildlife habitat types classified in the general Wright analysis area generally correspond with the major vegetation communities defined during the vegetation baseline survey. In terms of relative acres of occurrence, the predominant vegetation types are the Big Sage Shrubland (approximately 42 percent), Upland/Mixed Prairie Grassland (approximately 28 percent), and Crested Wheatgrass/Agricultural Pastureland (approximately 15 percent). Other habitats present within and around the West Jacobs Ranch LBA Tract include bottomland grassland, rough breaks, playas, reservoirs/stockponds, and disturbed lands. Disturbance areas associated with oil and gas development (i.e., networks of road and utility rights-of-way, tank batteries and well pads) overlay much of the tract's general analysis area and make up the majority of disturbed lands. Few trees are present due to the lack of water and suitable habitats, most of which are found primarily in shelterbelts planted adjacent to ranching facilities. Reclaimed lands include areas that were disturbed for road construction and the installation of oil and gas development-related facilities.

The existing Jacobs Ranch Mine permit area and the general analysis area for the West Jacobs Ranch LBA Tract are located in the North Prong Little Thunder Creek watershed. North Prong Little Thunder Creek and its tributaries, Dry Fork Little Thunder Creek and School Section Draw, drain the general analysis area for the West Jacobs Ranch LBA Tract. North Prong Little Thunder Creek flows from the northwest to the southeast across the LBA tract. Springen Draw, an ephemeral tributary to an internally-drained playa, drains a small area in the northeastern corner of the West Jacobs Ranch general analysis area. Typical of this semi-arid area, Little Thunder Creek and its tributaries are all ephemeral streams. The current mine plan for the adjacent Black Thunder Mine allows disturbance of Little Thunder Creek and several of its tributaries, including North Prong Little Thunder Creek.

Essentially all water courses in the tract's general analysis area are receiving, or have received, discharge water from CBNG development and, as a result, the frequency and duration of streamflow events have increased and periods of no flow are less common. At least 33 distinct diked impoundments are located within the West Jacobs Ranch tract's general analysis area. The shallow impoundments along Dry Fork Little Thunder Creek have seldom been completely dry in recent years. There are also a number of playas within the area that provide seasonal habitat for waterbirds and other aquatic species.

A preliminary wetland inventory of the general analysis area for the West Jacobs Ranch LBA Tract, based on USFWS NWI mapping and reconnaissance in the field, was conducted in 2007 and 2008. Some wetland areas previously mapped by the USFWS NWI have been recently altered due to CBNG-related water production within and upstream of the tract's general analysis area. The NWI maps were consulted prior to the initiation of the preliminary wetland field survey; however, the boundaries of the existing potential wetlands vary to a greater or lesser extent from the boundaries shown on the NWI maps. Due to the ephemeral nature of natural surface water features and CBNG dewatering activities, the boundaries, areas, and types of wetlands are likewise ephemeral. A formal jurisdictional wetland delineation survey for the West Jacobs Ranch LBA Tract would be conducted and submitted to the COE for verification as part of the mine permitting process, if the LBA tract is leased.

Within the entire general analysis area for the West Jacobs Ranch LBA Tract (9,370.4 acres), the preliminary wetland inventory identified a total of 68.4 acres of wetlands and OWUS. These wetlands and OWUS were found within four general land categories: ponds/reservoirs, ephemeral streams, playas, and isolated depressions. Of these 68.4 acres, approximately 16.7 acres are vegetated wetlands, which include 4.7 acres around ponds, 7.8 acres along ephemeral streams, 1.7 acres on playas, and 2.5 acres in other depressions. The remaining 51.7 acres are pond or channel other waters (i.e., open water in reservoirs/stockponds, along ephemeral streams, and in playas). All of these wetlands and OWUS are classified as palustrine. Most of the wetlands have emergent vegetation, while most of the ponds and playas have aquatic beds and are seasonally or temporarily flooded. The vegetated wetlands are located

primarily along the stream channels associated with Dry Fork and North Prong Little Thunder Creek.

At this time, a distinction has not been made between jurisdictional and non-jurisdictional acreages of wetlands and OWUS since only the COE has the authorization to make such determination following the submittal and review of a formal wetland delineation as part of the mine permitting process. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate the replacement of at least equal types and numbers of jurisdictional wetland acreages.

Within the general analysis area for the West Jacobs Ranch LBA Tract, no designated critical, crucial, or unique habitats designated by USFWS for T&E species are present.

## G-6.5 North Porcupine Tract

The North Porcupine LBA Tract and adjacent areas consist primarily of uplands (i.e., ground elevated above the lowlands that lie along the banks of drainages). The topography of the North Porcupine tract is influenced by Porcupine Creek and its tributaries. Land surface elevations in the tract's general analysis area range from 4,707 to 5,000 feet and approximately 81 percent of the land surface area has a slope of less than 5 percent. The average land surface slope over the entire general analysis area for the tract is approximately 3.2 percent. Surface mine lands, both active and reclaimed, dominate the landscape south and east of the North Porcupine LBA Tract.

Based on total acreages, the predominant vegetation types in the general analysis area for the North Porcupine tract are Big Sagebrush Grassland (53.85 percent) and Upland Grassland (31.78 percent), both of which occur primarily on the rolling upland terrain. Other habitat types common to North Porcupine include Breaks Grassland, Salt Grassland, Meadow Undeveloped Pastureland, Disturbed, Playa Grassland, Hayland, and Water areas. Disturbed areas are characterized primarily by a network of major roads and well pads that are stabilized with gravel or reclaimed. There are also small tank batteries and numerous miles of pipeline disturbance that, to varying degrees, are recovering vegetation cover. Those disturbances are associated with both CBNG and traditional oil and gas development in the area, though similar existing disturbance has occurred from ongoing surface mining activities.

The North Porcupine general analysis area and the majority of the existing North Antelope Rochelle Mine's permit area are located in the Porcupine Creek watershed. Porcupine Creek is an ephemeral stream in its upper reaches and an intermittent stream in its lower reaches. The North Antelope Rochelle Mine disturbs Porcupine Creek and several of its tributaries, and is currently permitted to disturb approximately 25 percent of Porcupine Creek's watershed. Approximately 6,221 acres, or about 84 percent of the 7,367-acre BLM study

area for the North Porcupine LBA Tract, drain to Porcupine Creek. A short reach of Porcupine Creek, which is a meandering ephemeral stream in this area, flows southeastward across the western portion of the North Porcupine LBA Tract. Several ephemeral tributaries of Porcupine Creek (e.g., Corder Creek, Boss Draw, Rat Draw, Gray Creek, and Chipmunk Draw) also cross the North Porcupine tract's general analysis area. The northeastern portion of the tract's general analysis area is drained by Trussler and School creeks, ephemeral tributaries of Little Thunder Creek. There are also some areas in the eastern portion of the general analysis area that do not contribute runoff to any stream and playas have formed in the lowest portions of these non-contributing drainage areas.

Formal jurisdictional wetland delineation surveys covering North Antelope Rochelle Mine's current permit area and some additional adjacent lands were completed by Powder River Coal, LLC (PRC) and submitted to the COE for verification in 1996, 1997, 1998, 2000, and 2004. These wetland delineations and the COE's respective letters of verification summarizing the acreage figures of approved jurisdictional determinations are included in Appendix D-10 of the mine's permit (PRC 2009). According to the COE's latest (October 12, 2004) jurisdictional determination, there is a total of 219.71 acres of jurisdictional wetlands and OWUS within the mine's current permit area. Of those 219.71 acres, there are 77.84 acres of riverine wetlands, 26.99 acres of stockpond wetlands, 11.42 acres of riverine open water OWUS, 44.62 acres of stockpond open water OWUS, and 58.84 acres of ephemeral stream channel OWUS. There are also 20.92 wetland acres and 1.33 open water acres of non-jurisdictional playa/depressional features.

The general analysis area for the North Porcupine LBA Tract lies completely within North Antelope Rochelle Mine's current mine permit area. Therefore, these previous wetland delineation surveys provide an estimate of the acreages of wetlands and OWUS that exist within the LBA tract's general analysis area, with the caveat that some wetland areas previously mapped may have been altered by CBNG-related water production within and upstream of the general analysis area. In addition to the effects from CBNG-related water discharges, the PRB has experienced a moderate to severe drought cycle that has persisted since 2000, which may have also altered previously-mapped wetland and OWUS areas. The boundaries of some wetlands and OWUS could, therefore, vary to a greater or lesser extent from the boundaries that existed at the time that the formal wetland delineation surveys were conducted.

Within the general analysis area for the North Porcupine LBA Tract (9,021.4 acres), there are an estimated 19.7 acres of jurisdictional wetlands and OWUS. Of those 19.7 acres, there are approximately 9.3 acres of riverine wetlands, approximately 0.9 acres of stockpond wetlands, approximately 0.9 acres of stockpond open water OWUS, and approximately 8.6 acres of ephemeral stream channel OWUS. There are also approximately 4.9 wetland acres and 1.2 open water acres of non-jurisdictional playa/depressional features. The vegetated wetland areas consist primarily of palustrine emergent herbaceous

wet meadow or marsh and palustrine aquatic beds located along ephemeral stream channels and around ponds, playas and depressions, whereas the OWUS consist of dry ephemeral drainages and open water.

Only the COE has the authorization to determine whether or not wetlands are jurisdictional or non-jurisdictional, following the submittal and review of a formal wetland delineation as part of the mine permitting process. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate the replacement of at least equal types and numbers of jurisdictional wetland acreages.

Within the general analysis area for the North Porcupine LBA Tract, no designated critical, crucial, or unique habitats designated by USFWS for T&E species are present.

### G-6.6 South Porcupine Tract

Of the six LBA tracts included in this analysis, the topography of the South Porcupine tract is somewhat unique due to the presence of more pronounced gullies and deeper tributary draws that are formed by the headwaters of Antelope, Horse, and Porcupine creeks. Land surface elevations in the tract's general analysis area range from 4,675 to 4,950 feet, and approximately 51 percent of the land surface area has a slope of less than 5 percent. The average land surface slope over the entire general analysis area for the tract is approximately 6.2 percent. Surface mine lands, both disturbed and reclaimed, dominate the landscape north, south and east of the South Porcupine LBA Tract.

Based on total acreages, the predominant vegetation types in the general analysis area for the South Porcupine tract are Upland Grassland (55.7 percent) and Breaks Grassland (23.5 percent), both of which occur primarily on the rolling upland terrain. Other habitat types common to South Porcupine include Salt Grassland, Playa Grassland, Disturbed, and Water areas. Disturbed areas are characterized primarily by a network of major roads and well pads that are stabilized with gravel or reclaimed. There are also small tank batteries and numerous miles of pipeline disturbance that, to varying degrees, are recovering vegetation cover. Those disturbances are associated with both CBNG and traditional oil and gas development in the area, though similar existing disturbance has occurred from ongoing surface mining activities.

As stated above, the South Porcupine LBA Tract is located at the headwaters of tributaries to Antelope, Horse, and Porcupine creeks. Surface water drainage in the tract is divided, in that the northern and eastern portions of the tract drain north and east to Porcupine Creek via several of its ephemeral tributaries, the southern portion of the tract drains south to Antelope Creek via several of its ephemeral tributaries, and the western portion of the tract drains

west to Horse Creek via several of its ephemeral tributaries. With the exception of about 60 acres, the entire BLM study area for the South Porcupine LBA Tract is within the existing North Antelope Rochelle Mine's permit area. The North Antelope Rochelle Mine disturbs Porcupine Creek and several of its tributaries as well as several of Antelope Creek's unnamed ephemeral tributaries. The mine is currently permitted to disturb approximately 25 percent of Porcupine Creek's watershed.

All but about 140 acres of the general analysis area for the South Porcupine LBA Tract lies within North Antelope Rochelle Mine's current mine permit area. Therefore, the mine's wetland delineation surveys provide an estimate of the acreages of wetlands and OWUS that exist within the LBA tract's general analysis area, with the caveat that some wetland areas previously mapped may have been altered by CBNG-related water production within and upstream of the tract's general analysis area. In addition to the effects from CBNG-related water discharges, the PRB has experienced a moderate to severe drought cycle that has persisted since 2000, which may have also altered previously-mapped wetland and OWUS areas. The boundaries of some wetlands and OWUS could, therefore, vary to a greater or lesser extent from the boundaries that existed at the time that the formal wetland delineation surveys were conducted.

Within the general analysis area for the South Porcupine LBA Tract (4,020.5 acres), there are an estimated 12.3 acres of jurisdictional wetlands and OWUS. Of those 12.3 acres, there are approximately 6.8 acres of riverine wetlands, approximately 0.4 acres of stockpond wetlands, approximately 0.2 acres of stockpond open water OWUS, and approximately 4.9 acres of ephemeral stream channel OWUS. There are also approximately 0.2 wetland acres of non-jurisdictional playa/depressional features. The vegetated wetland areas consist primarily of palustrine emergent herbaceous wet meadow or marsh along ephemeral stream channels and around ponds, playas and depressions, whereas the OWUS consist of dry ephemeral drainages and open water.

Only the COE has the authorization to determine whether or not wetlands are jurisdictional or non-jurisdictional, following the submittal and review of a formal wetland delineation as part of the mine permitting process. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate the replacement of at least equal types and numbers of jurisdictional wetland acreages.

Within the general analysis area for the South Porcupine LBA Tract, no designated critical, crucial, or unique habitats designated by USFWS for T&E species are present.

## G-7.0 CURRENT STATUS AND HABITAT REQUIREMENTS OF SPECIES

The following subsections describe the current status and habitat requirements of the Ute ladies'-tresses orchid (*Spiranthes diluvialis*), black-footed ferret (*Mustela nigripes*), and blowout penstemon (*Penstemon haydenii*).

### G-7.1 Ute Ladies'-tresses (*Spiranthes diluvialis*)

Ute ladies'-tresses, a member of the orchid family, was listed under the ESA by the USFWS as threatened on January 17, 1992. At the time of listing, Ute ladies'-tresses was only known from Colorado, Utah, and extreme eastern Nevada. Ute ladies'-tresses orchids were discovered in Goshen County Wyoming in 1993. It is currently known from western Nebraska, east-central and southeastern Wyoming, north-central and northwestern Colorado, northeastern, south-central and western Utah, southeastern Idaho, southwestern Montana, southeastern Nevada, central Washington, and most recently in British Columbia, Canada (Brown 2008). Within Wyoming, Ute ladies'-tresses, the state's rarest orchid, is known from Converse, Goshen, Laramie, and Niobrara counties in the Antelope Creek, Horse Creek, and Niobrara River watersheds (Fertig 2000, Heidel 2007). There is no designated critical habitat for the species in either Campbell or Converse counties, Wyoming (USFWS 2008).

The ESA defines a threatened species as any species which is likely to become in danger of extinction within the foreseeable future throughout all or a significant portion of its range. The Ute ladies'-tresses was listed as threatened due to a variety of factors including geographic rarity, small population size, low reproductive rate, and habitat loss and modification (USFWS 1992a).

#### G-7.1.1 Biology and Habitat Requirements

Ute ladies'-tresses is a perennial, terrestrial orchid with 7- to 32-inch stems arising from tuberously thickened roots. The flowering stalk consists of a few to many small white or ivory-colored flowers that are arranged in a loose spiral at the top of the stem (USFWS 2009d). Flowers are needed for positive plant identification, and the plant can be reliably located only when it is flowering (Heidel 2001).

In Wyoming, this species typically blooms from late July through early September (Heidel 2007). Flowering, which occurs mainly in August and takes about 2 weeks for any one plant, starts from the bottom upward on the flowering spike (Heidel et al. 2008). Leaves, which are separate from one another or joined only at the very base of the plant, persist during flowering (Moseley 1998). Plants do not flower every year and may remain dormant below ground during adverse (i.e., drought) conditions. In general, the species' best flowering years seem to correspond with extreme heat during flowering. Preliminary review of climate data also indicates that growing seasons that

start out as relatively cold and wet correspond with low flowering levels (Heidel 2001).

Flowers must be pollinated to produce seeds. No direct observations of pollination have been made in Wyoming. Sipes and Tepedino (1995) indicated that large, long-tongued bumblebees in the genus *Bombus* are the primary pollinators in Utah and Colorado. Smaller bees may also visit these flowers, but have the incorrect body shape or mass to properly accommodate the orchid's large, sticky anther/pollen clusters (Fertig 2000).

Sipes and Tepedino (1995) estimate that individual seed pods may contain several hundred to several thousand seeds apiece and an entire plant may produce as many as 100,000 seeds in a year. As with other orchid species, Ute ladies'-tresses' seeds are microscopic dust-like, and are readily dispersed by wind or water (Fertig et al. 2005). Orchids with microscopic seeds are most commonly distributed by the wind and therefore may be widely dispersed for great distances (Arditti and Ghani 2000).

After its microscopic seeds germinate, the roots form an interdependent relationship with a fungus, which are called mycorrhizae. In any given year, individual Ute ladies'-tresses plants may flower, remain in an inconspicuous vegetative stage with narrow leaves, or remain entirely below ground with the help of its mycorrhizae symbiont (Fertig 2000, Heidel et al. 2008). The absence or rarity of appropriate symbionts in the soil may be a major factor limiting the establishment of the *Spiranthes diluvialis* populations. Surviving seedlings probably develop slowly into larger dormant mycorrhizal roots or grow directly into aboveground vegetative shoots, but apparently neither has been confirmed in the wild (Fertig et al. 2005). No data are available on the number of years required for subterranean Ute ladies'-tresses roots to reach sufficient size to develop aboveground leafy shoot, although related species may remain dormant for 8-11 years (Wells 1981). Long-term demographic monitoring studies indicate that the plant can revert to belowground existence for one to four or more growing seasons before re-emerging with new shoots (Arft 1995, Heidel 2001). Although considered dormant, belowground plants remain metabolically active and derive nourishment from their mycorrhizal partners or food stores laid down when photosynthetic shoots were present (Fertig et al. 2005).

The Ute ladies'-tresses preferred habitat typically occurs in moist valley bottoms where perennial rivers and streams are fed by groundwater (Heidel et al. 2008). The species occurs primarily on low, flat floodplain terraces or abandoned oxbows within 2-150 feet of small perennial streams or rivers. These terraces are subirrigated, often seasonally flooded, and remain moist throughout most of the growing season. It typically occurs in stable wetland and seepy areas within historical floodplains of major rivers, as well as in wetlands and seeps near freshwater lakes or springs. Nearly all occupied sites have a high water table (usually within 5 to 18 inches of the surface) augmented by seasonal flooding, snowmelt, runoff and irrigation (USFWS

2009d). Ute ladies'-tresses seem to require "permanent sub-irrigation," indicating a close affinity with floodplain areas where the water table is near the surface throughout the growing season and into the late summer and early autumn (USFWS 1995). The species seems to prefer well drained, sandy to silty loam soils derived from alluvial deposits with a slightly basic pH (University of Wyoming 2008). It is not found in heavy or tight clay soils or in extremely saline or alkaline (pH > 8) soils (USFWS 2009d).

Surveys conducted since 1992 have expanded the number of vegetation and hydrology types occupied by Ute ladies'-tresses to include subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. Populations have also been discovered along irrigation canals, berms, irrigated meadows, excavated gravel pits, roadside borrow pits, and other human-modified wetlands. The orchid is well adapted to disturbances from stream movement within floodplains over time and is tolerant of other disturbances such as grazing that are common to grassland riparian habitats (USFWS 1995). Populations are often dynamic and "move" within a watershed as disturbances create new habitat or succession eliminates old habitat (Fertig and Beauvais 1999). The orchid has been known to establish in heavily disturbed sites, such as revegetated gravel pits, heavily grazed riparian edges, and along well-traveled foot trails on old berms (USFWS 1995). The elevation range in which the species is known to occur is from 720 feet in Washington to 7,000 feet in Utah (USFWS 2009d).

The grassy vegetation of Ute ladies'-tresses habitat is relatively short (usually less than 18 inches) but dense, usually in full sun but sometimes partial shade. The wet meadow communities preferred by the plant are dominated by redtop (*Agrostis stolonifera*), common quackgrass (*Elytrigia repens*), foxtail barley (*Hordeum jubatum*), switchgrass (*Panicum virgatum*), and occasionally Baltic rush (*Juncus balticus*) or few-flowered spikerush (*Eleocharis quinqueflora*) within a narrow vegetative band between emergent aquatic vegetation and adjacent dry upland prairie (Fertig 2000, Heidel 2007). Other associated species include horsetail (*Equisetum laevigatum*), milkweed (*Asclepias L.*), goldenrod (*Solidago L.*), arrowgrass (*Triglochin L.*), blue-eyed grasses (*Sisyrinchium angustifolium* and *S. montanum*), three-square (*Schoenoplectus pungens*), and white prairie aster (*Symphyotrichum falcatum*) (Fertig et al. 2005, Heidel et al. 2008). Vegetation cover is typically 75-90 percent and the Ute ladies'-tresses usually occur as small scattered groups and occupy relatively small areas within the riparian system (Fertig 2000). The orchid persists in those areas where the hydrology provides continual dampness in the rooting zone throughout the growing season, but is not tolerant of long term standing water, and does not compete with emergent plant species (e.g., cattails) or aggressive species that form dense monocultures such as Canada thistle (USFWS 1995).

### G-7.1.2 LBA Tracts Existing Environments

Prior to 2005, four Ute ladies'-tresses populations had been documented within Wyoming, all discovered between 1993 and 1997 (Fertig and Beauvais 1999). Four additional sites were located in 2005 and one additional site was found in 2006 (Heidel 2007). The new locations were in the same drainages or tributaries as the original four populations. Drainages with documented orchid populations include Antelope Creek and its tributaries in northern Converse County, Bear Creek in northern Laramie and southern Goshen counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. The nearest population to the general Wright analysis area is located on an unnamed tributary of Antelope Creek in northern Converse County. No occurrences have been recorded in Campbell County, and there is no designated critical habitat for Ute ladies'-tresses within the general Wright analysis area.

In order to adequately determine the presence of the species, areas of potentially suitable habitat within the general analysis area for each of the WAC LBA tracts were surveyed during the period that the orchids in Converse County are known to flower. Dormant plants can typically persist belowground for one to many years and can only be reliably documented after several years of repeated surveys (Lesica and Steel 1994). The USFWS Interim Survey Requirements for Ute ladies'-tresses therefore recommends that all suitable habitat be surveyed annually for three consecutive years (USFWS 1992b). For each LBA tract's general analysis area, topographical and wetland delineation maps were reviewed to identify all areas that may contain the species. Other potentially suitable habitat factors included less steep stream banks, light soil texture and well drained soils, close lateral or vertical distance to perennial water source during the flowering period, lack of plant competition, lack of general soil alkalinity/salinity, and current or historical land management practices that did not promote overgrazing and extensive use of riparian areas.

USFWS requires a statement of surveyor qualifications as part of a field survey. Field surveys were conducted by qualified personnel, whose botanical experience and training in conducting rare plant surveys, including *Spiranthes diluvialis*, are included below in Section G-13.0. The results of the field surveys for each LBA tract are included within the following subsections.

#### G-7.1.2.1 North Hilight Field

The nearest known population of Ute ladies'-tresses to the North Hilight Field LBA Tract is located on a tributary of Antelope Creek in northern Converse County, roughly 35 miles southwest of the tract. The North Hilight Field tract is not located within the Antelope Creek drainage basin.

Topographical and wetland delineation maps of the North Hilight Field tract were reviewed to identify potentially suitable habitat for Ute ladies'-tresses prior to conducting the field surveys. Refer to Section G-6.1 for a description of the landscape and potential wetland areas identified within the general

analysis area for the North Hilight Field tract. The preliminary wetland inventory that was conducted in 2007 identified a total of 177.5 acres of wetlands and OWUS, which were all vegetated wetlands, and no areas of open water (pond or channel OWUS) were observed. Figure G-21 depicts the USFWS NWI mapping within the North Hilight Field tract's general analysis area. Most of the potentially suitable habitat within the general analysis area and adjacent areas is found along the ephemeral stream channels that drain south toward North Prong Little Thunder Creek, north toward Black Thunder Creek, or toward internally drained playas. Limited portions of these drainages may receive recharge from bank storage making them locally intermittent. In response to surface discharge of groundwater associated with CBNG development on or upstream of the North Hilight Field LBA Tract, which was a relatively recent phenomenon, streamflow was more persistent in the ephemeral channels and the duration of time that some playas and in-channel reservoirs held water was extended before going dry. In 2009, surveyors observed that groundwater discharges from local CBNG production declined, reducing the amount of potentially suitable habitat for Ute ladies'-tresses.

Areas of potentially suitable habitat within the general analysis area for the North Hilight Field LBA Tract were surveyed by Habitat Management, Inc. on August 11-15, 2008 and on August 12, 2009. Pedestrian surveys were conducted during the time of flowering of the known population in Converse County and involved walking entirely around all areas that have been identified as potential wetlands, including the entire lengths of the ephemeral drainage channels (Figure G-21), documenting locations of potentially suitable habitat and searching for this species. Outside of these areas, favorable habitat conditions do not exist within the tract's general analysis area. No Ute ladies'-tresses were found during the 2008 and 2009 surveys. In order to adequately determine the presence of the species, an additional survey by Habitat Management, Inc. is scheduled during the flowering period, from mid-August to early September, in 2010.

Previous surveys for Ute ladies'-tresses have been conducted within the adjacent Jacobs Ranch and Black Thunder mines' existing permit areas in order to evaluate the potential effects of leasing federal coal reserves within those areas on the federally listed species. For example, the North Hilight Field tract is contiguous to two federal coal leases that were recently issued to these two mines: the North Jacobs Ranch LBA Tract, which is within the Jacobs Ranch Mine permit area, and the Little Thunder LBA Tract, which is within the Black Thunder Mine permit area. The results of those surveys are included within the Final EIS for the North Jacobs Ranch Coal Lease Application (BLM 2001b) and the Final South Powder River Basin Coal EIS (BLM 2003). (Note: Table 1-1 of this EIS lists the LBA tract names, the respective applicant mines, and the dates that each maintenance coal lease was issued in the Powder River Basin since 1992.) The potential suitable habitat within the study area for the North Jacobs Ranch LBA Tract was surveyed by Intermountain Resources during the flowering period in July and August 1999 and no Ute ladies'-tresses were found (BLM 2001b). The potential suitable habitat within the study area

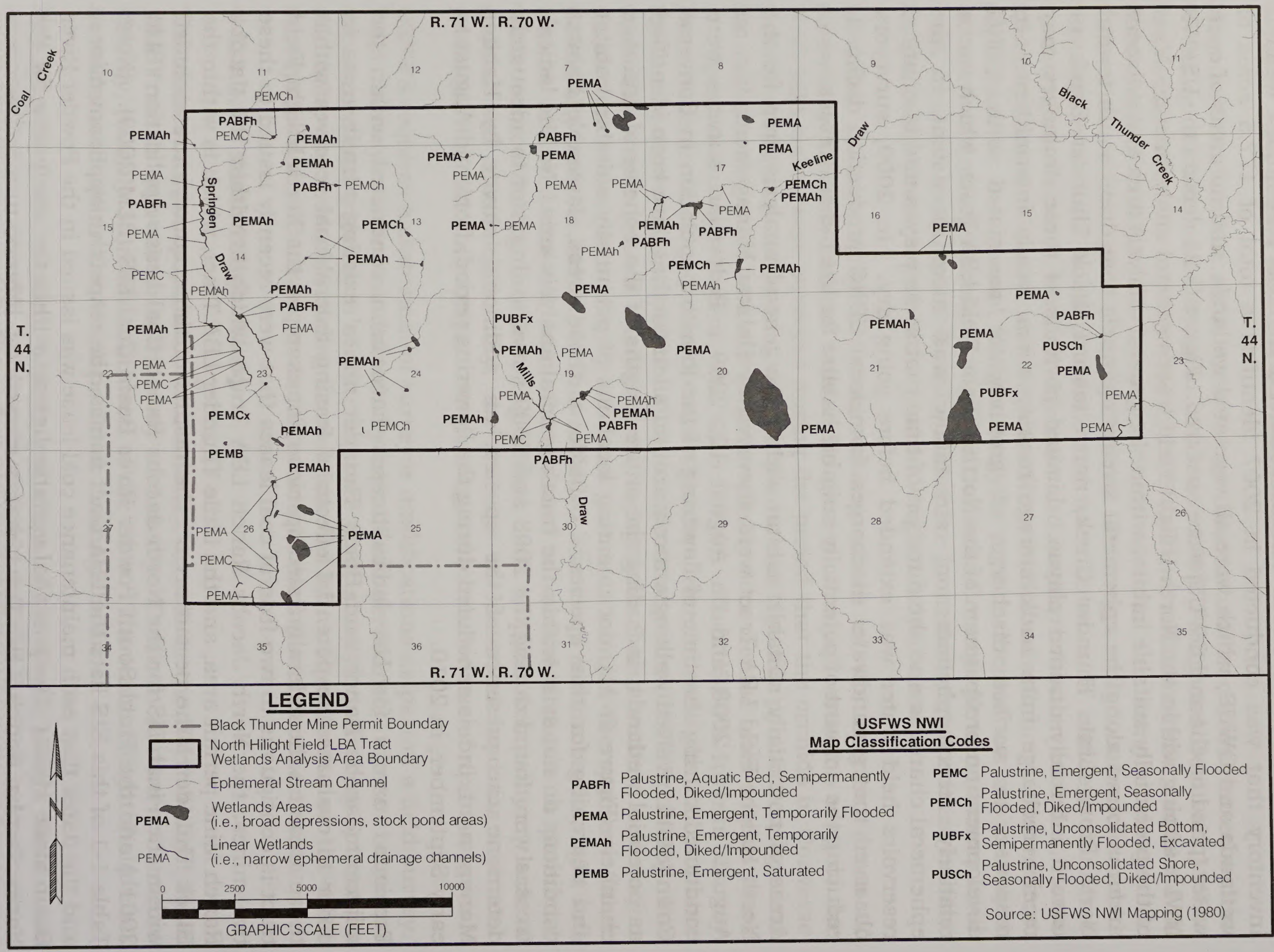


Figure G-21. Wetlands Within the General Analysis Area for the North Hilight Field LBA Tract.

for the Little Thunder LBA Tract was surveyed by Intermountain Resources during the flowering period in August 2001 and no Ute ladies'-tresses were found (BLM 2003).

In addition to the BAs that have been prepared to evaluate the potential effects of leasing federal coal tracts to the adjacent mines, BAs have also been prepared to address the potential effects to federally listed species by disturbing federal surface lands that are located inside the mines' existing permit areas but are outside the mines' federal coal lease boundaries. Those BAs, which have been submitted to the appropriate land management agency (i.e., USFS), document the results of field surveys in those areas, and to date, all surveys for Ute ladies'-tresses in the general Wright analysis area have resulted in negative findings.

#### G-7.1.2.2 South Hilight Field

The nearest known population of Ute ladies'-tresses to the South Hilight Field LBA Tract is located on a tributary of Antelope Creek in northern Converse County, roughly 30 miles southwest of the tract. The South Hilight Field tract is not located within the Antelope Creek drainage basin.

Topographical and wetland delineation maps of the South Hilight Field tract were reviewed to identify potentially suitable habitat for Ute ladies'-tresses prior to conducting the field surveys. Refer to Section G-6.2 for a description of the landscape and potential wetland areas identified within the general analysis area for the South Hilight Field tract. The preliminary wetland inventory that was conducted in 2007 identified a total of 55.1 acres of wetlands and OWUS, which were predominantly vegetated wetlands and roughly 1 acre of aquatic beds and 2.8 acres of open water within the channel of Little Thunder Creek were observed. Figure G-22 depicts the USFWS NWI mapping within the South Hilight Field tract's general analysis area. Most of the potentially suitable habitat within the general analysis area and adjacent areas is found along Little Thunder Creek, which flows from west to east through the northern portion of the tract. Nearly half of the study area drains toward playas that are formed by natural topographic depressions. All drainages within and around this area, including Little Thunder Creek, are ephemeral. Limited portions of these drainages may receive recharge from bank storage making them locally intermittent. In response to surface discharge of groundwater associated with CBNG development on or upstream of the South Hilight Field LBA Tract, which was a relatively recent phenomenon, streamflow was more persistent in the ephemeral channels and the duration of time that some playas and in-channel reservoirs held water was extended before going dry. In 2009, surveyors observed that groundwater discharges from local CBNG production declined, reducing the amount of potentially suitable habitat for Ute ladies'-tresses.

Areas of potentially suitable habitat within the general analysis area for the South Hilight Field LBA Tract were surveyed by Habitat Management, Inc. on

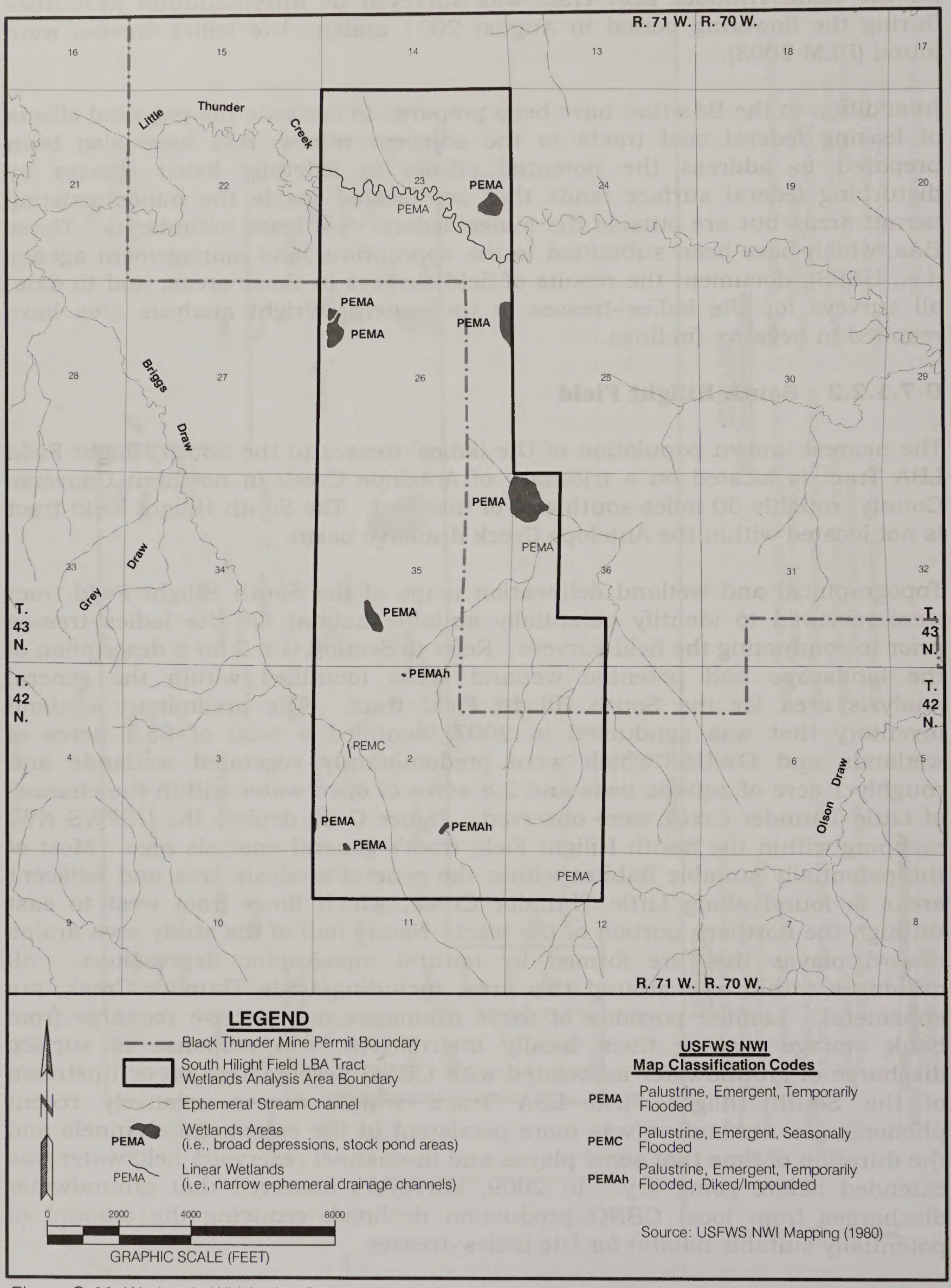


Figure G-22. Wetlands Within the General Analysis Area for the South Hilight Field LBA Tract.

August 11-15, 2008 and on August 12, 2009. Pedestrian surveys were conducted during the time of flowering of the known population in Converse County and involved walking entirely around all areas that have been identified as potential wetlands, including the entire lengths of the ephemeral drainage channels (Figure G-22), documenting locations of potentially suitable habitat and searching for this species. Outside of these areas, favorable habitat conditions do not exist within the tract's general analysis area. No Ute ladies'-tresses were found during the 2008 and 2009 surveys. In order to adequately determine the presence of the species, an additional survey by Habitat Management, Inc. is scheduled during the flowering period, from mid-August to early September, in 2010.

Previous surveys for Ute ladies'-tresses have been conducted within the adjacent Black Thunder Mine's existing permit area and the proposed School Creek Mine's permit area in order to evaluate the potential effects of leasing federal coal reserves within those areas on the federally listed species. For example, the South Hilight Field tract is contiguous to two federal coal leases that were recently issued to these two mines: the Little Thunder LBA Tract, which is within the Black Thunder Mine permit area, and the West Roundup LBA Tract, which is within the proposed School Creek Mine permit area. The results of those surveys are included within the Final South Powder River Basin Coal EIS (BLM 2003). (Note: Table 1-1 of this EIS lists the LBA tract names, the respective applicant mines, and the dates that each maintenance coal lease was issued in the Powder River Basin since 1992.) The potential suitable habitat within the study area for the Little Thunder LBA Tract was surveyed by Intermountain Resources during the flowering period in August 2001 and no Ute ladies'-tresses were found (BLM 2003). The potential suitable habitat within the study area for the West Roundup LBA Tract was surveyed by Intermountain Resources during the flowering period in July and August 2001 and no Ute ladies'-tresses were found (BLM 2003).

In addition to the BAs that have been prepared to evaluate the potential effects of leasing federal coal tracts to the adjacent mines, BAs have also been prepared to address the potential effects to federally listed species by disturbing federal surface lands that are located inside the mines' existing permit areas but are outside the mines' federal coal lease boundaries. Those BAs, which have been submitted to the appropriate land management agency (i.e., USFS), document the results of field surveys in those areas, and to date, all surveys for Ute ladies'-tresses in the general Wright analysis area have resulted in negative findings.

#### G-7.1.2.3 West Hilight Field

The nearest known population of Ute ladies'-tresses to the West Hilight Field LBA Tract is located on a tributary of Antelope Creek in northern Converse County, roughly 30 miles southwest of the tract. The West Hilight Field tract is not located within the Antelope Creek drainage basin.

Topographical and wetland delineation maps of the West Hilight Field tract were reviewed to identify potentially suitable habitat for Ute ladies'-tresses prior to conducting the field surveys. Refer to Section G-6.3 for a description of the landscape and potential wetland areas identified within the general analysis area for the West Hilight Field tract. The preliminary wetland inventory that was conducted in 2007 identified a total of 262.7 acres of wetlands and OWUS, which were predominantly vegetated wetlands and roughly 12 acres of aquatic beds and 10 acres of open water held within the channel of Little Thunder Creek and the Little Thunder Reservoir. Figure G-23 depicts the USFWS NWI mapping within the West Hilight Field tract's general analysis area. Most of the potentially suitable habitat within the general analysis area and adjacent areas is found along Little Thunder Creek, which flows from west to east through the central portion of the tract, and its ephemeral tributaries, Briggs Draw and Black Butte Draw, which drain the southern portion of the general analysis area. Nearly a quarter of the study area drains toward playas that are formed by natural topographic depressions; the largest of which is called Rochelle Lake. All drainages within and around this area, including Little Thunder Creek, are ephemeral. Limited portions of these drainages may receive recharge from bank storage making them locally intermittent. In response to surface discharge of groundwater associated with CBNG development on or upstream of the South Hilight Field LBA Tract, which was a relatively recent phenomenon, streamflow was more persistent in the ephemeral channels and the duration of time that some playas and in-channel reservoirs held water was extended before going dry. In 2009, surveyors observed that groundwater discharges from local CBNG production declined, reducing the amount of potentially suitable habitat for Ute ladies'-tresses.

Areas of potentially suitable habitat within the general analysis area for the West Hilight Field LBA Tract were surveyed by Habitat Management, Inc. on August 11-15, 2008 and on August 12, 2009. Pedestrian surveys were conducted during the time of flowering of the known population in Converse County and involved walking entirely around all areas that have been identified as potential wetlands, including the entire lengths of the ephemeral drainage channels (Figure G-23), documenting locations of potentially suitable habitat and searching for this species. Outside of these areas, favorable habitat conditions do not exist within the tract's general analysis area. No Ute ladies'-tresses were found during the 2008 and 2009 surveys. In order to adequately determine the presence of the species, an additional survey by Habitat Management, Inc. is scheduled during the flowering period, from mid-August to early September, in 2010.

Previous surveys for Ute ladies'-tresses have been conducted within the adjacent Black Thunder Mine's existing permit area in order to evaluate the potential effects of leasing federal coal reserves within that area on the federally listed species. For example, the West Hilight Field tract is contiguous to the Little Thunder LBA Tract, which was recently issued as a maintenance lease to the Black Thunder Mine. The results of those surveys are included within the Final South Powder River Basin Coal EIS (BLM 2003). (Note: Table 1-1 of this

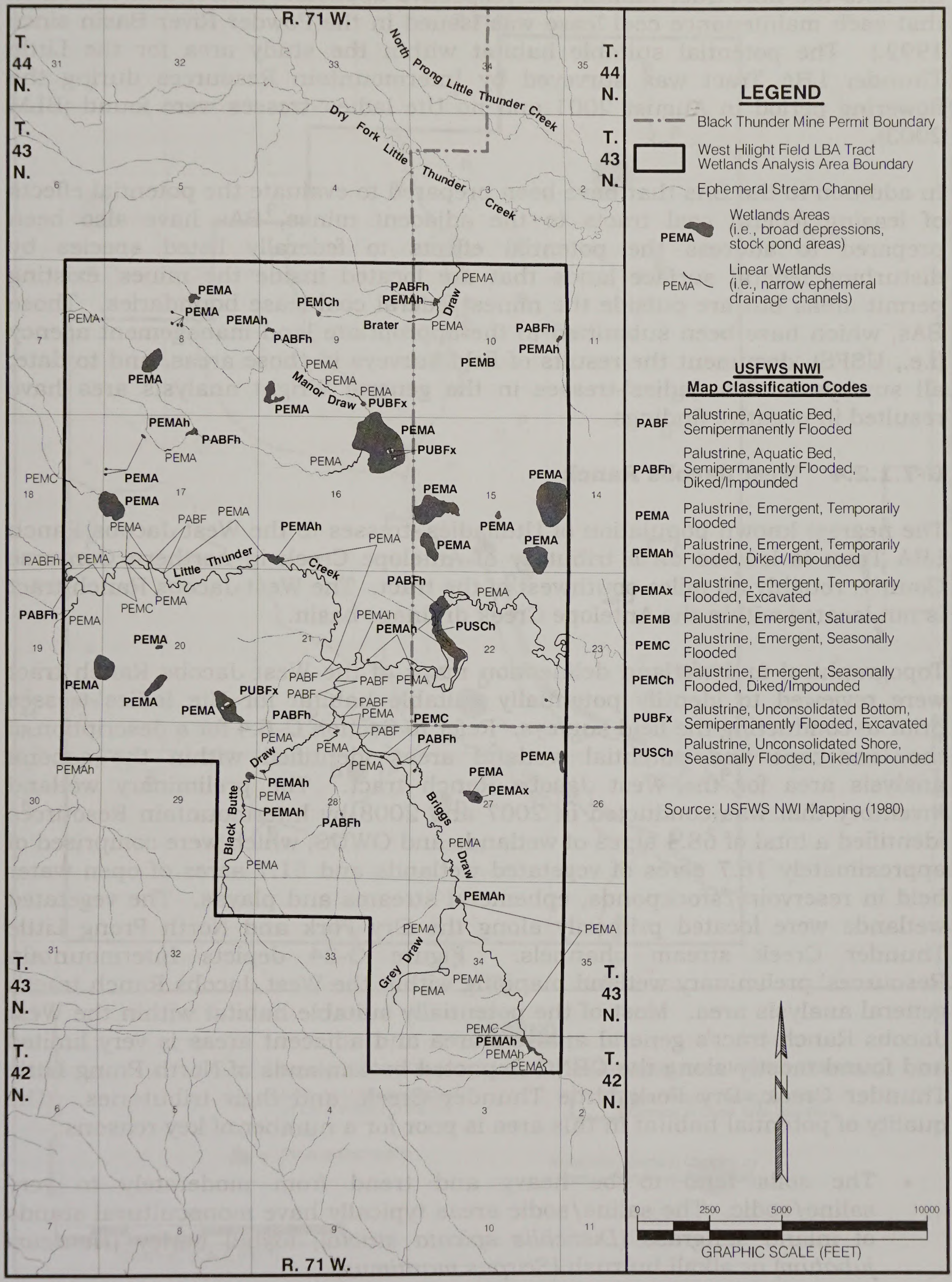


Figure G-23. Wetlands Within the General Analysis Area for the West Hilight Field LBA Tract.

EIS lists the LBA tract names, the respective applicant mines, and the dates that each maintenance coal lease was issued in the Powder River Basin since 1992.) The potential suitable habitat within the study area for the Little Thunder LBA Tract was surveyed by Intermountain Resources during the flowering period in August 2001 and no Ute ladies'-tresses were found (BLM 2003).

In addition to the BAs that have been prepared to evaluate the potential effects of leasing federal coal tracts to the adjacent mines, BAs have also been prepared to address the potential effects to federally listed species by disturbing federal surface lands that are located inside the mines' existing permit areas but are outside the mines' federal coal lease boundaries. Those BAs, which have been submitted to the appropriate land management agency (i.e., USFS), document the results of field surveys in those areas, and to date, all surveys for Ute ladies'-tresses in the general Wright analysis area have resulted in negative findings.

#### G-7.1.2.4 West Jacobs Ranch

The nearest known population of Ute ladies'-tresses to the West Jacobs Ranch LBA Tract is located on a tributary of Antelope Creek in northern Converse County, roughly 30 miles southwest of the tract. The West Jacobs Ranch tract is not located within the Antelope Creek drainage basin.

Topographical and wetland delineation maps of the West Jacobs Ranch tract were reviewed to identify potentially suitable habitat for Ute ladies'-tresses prior to conducting the field surveys. Refer to Section G-6.4 for a description of the landscape and potential wetland areas identified within the general analysis area for the West Jacobs Ranch tract. The preliminary wetland inventory that was conducted in 2007 and 2008 by Intermountain Resources identified a total of 68.4 acres of wetlands and OWUS, which were comprised of approximately 16.7 acres of vegetated wetlands and 51.7 acres of open water held in reservoirs/stockponds, ephemeral streams and playas. The vegetated wetlands were located primarily along the Dry Fork and North Prong Little Thunder Creek stream channels. Figure G-24 depicts Intermountain Resources' preliminary wetland mapping within the West Jacobs Ranch tract's general analysis area. Most of the potentially suitable habitat within the West Jacobs Ranch tract's general analysis area and adjacent areas is very limited and found mostly along the CBNG-impacted bottomlands of North Prong Little Thunder Creek, Dry Fork Little Thunder Creek, and their tributaries. The quality of potential habitat in this area is poor for a number of key reasons:

- The soils tend to be heavy and trend from moderately to very saline/sodic. The saline/sodic areas typically have monocultural stands of inland saltgrass (*Distichlis spicata stricta*), foxtail barley (*Hordeum jubatum*) or alkali bulrush (*Scirpus maritimus*).

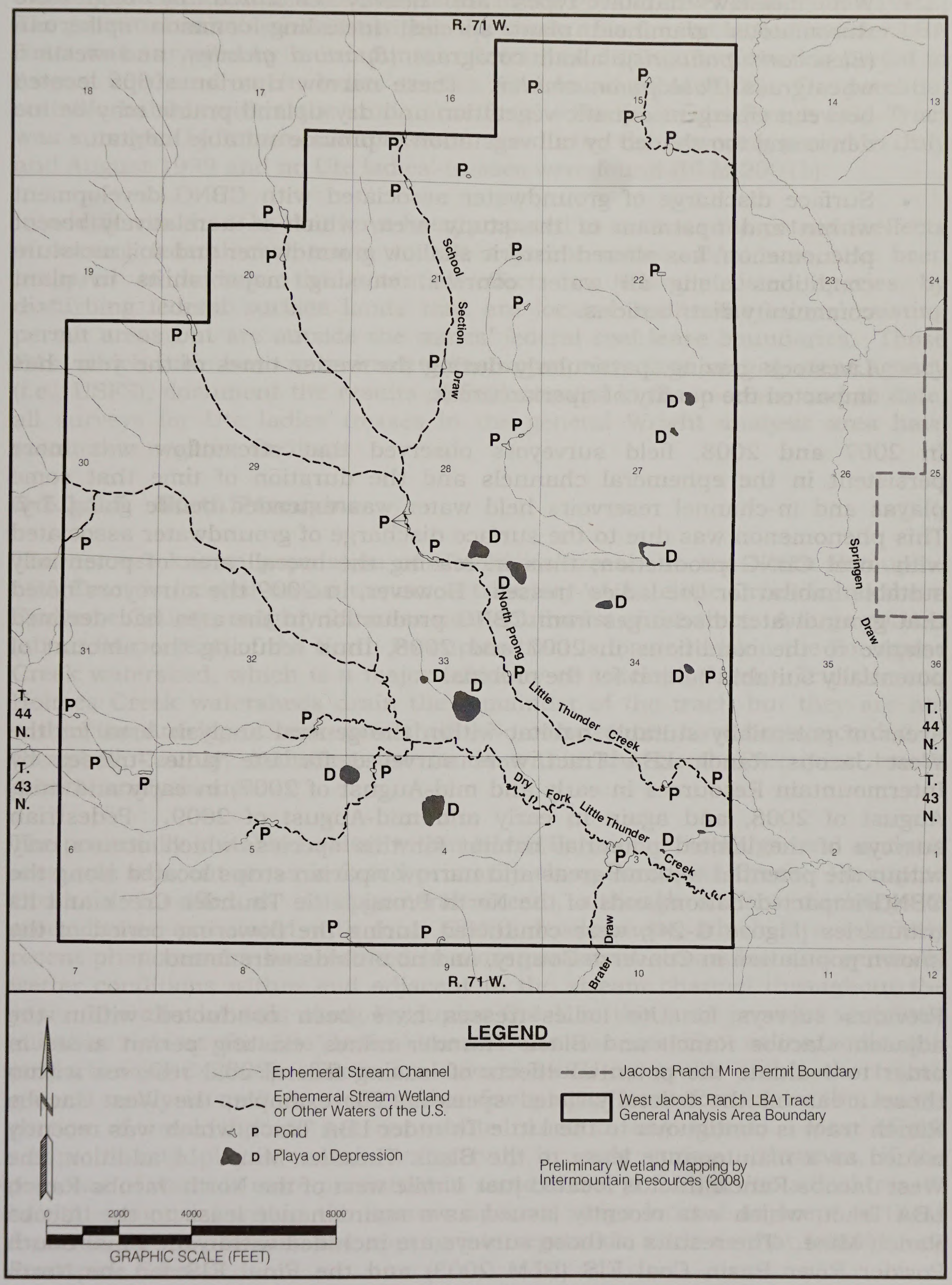


Figure G-24. Wetlands Within the General Analysis Area for the West Jacobs Ranch LBA Tract.

- Wet meadow habitat types are heavily colonized by aggressive rhizomatous graminoid plant species, including common spikerush (*Eleocharis palustris*), alkali cordgrass (*Spartina gracilis*), and western wheatgrass (*Pascopyron smithii*). These narrow riparian strips located between emergent aquatic vegetation and dry upland prairie may be too dense and too shaded by tall vegetation to provide suitable habitat.

- Surface discharge of groundwater associated with CBNG development within and upstream of the study area, which is a relatively recent phenomenon, has altered historic shallow groundwater and soil moisture conditions along all water courses, causing major shifts in plant community distributions.

- Livestock grazing, particularly during the wetter times of the year, has impacted the quality of riparian areas.

In 2007 and 2008, field surveyors observed that streamflow was more persistent in the ephemeral channels and the duration of time that some playas and in-channel reservoirs held water was extended before going dry. This phenomenon was due to the surface discharge of groundwater associated with local CBNG production, thus increasing the overall area of potentially suitable habitat for Ute ladies'-tresses. However, in 2009 the surveyors noted that groundwater discharges from CBNG production in the area had declined relative to the conditions in 2007 and 2008, thus reducing the amount of potentially suitable habitat for the orchids.

Areas of potentially suitable habitat within the general analysis area for the West Jacobs Ranch LBA Tract were surveyed for Ute ladies'-tresses by Intermountain Resources in early and mid-August of 2007, in early and mid-August of 2008, and again in early and mid-August of 2009. Pedestrian surveys of the limited potential habitat for this species, which occurs only within the potential wetland areas and narrow riparian strips located along the CBNG-impacted bottomlands of the North Prong Little Thunder Creek and its tributaries (Figure G-24), were conducted during the flowering period of the known population in Converse County, and no orchids were found.

Previous surveys for Ute ladies'-tresses have been conducted within the adjacent Jacobs Ranch and Black Thunder mines' existing permit areas in order to evaluate the potential effects of leasing federal coal reserves within those areas on the federally listed species. For example, the West Jacobs Ranch tract is contiguous to the Little Thunder LBA Tract, which was recently issued as a maintenance lease to the Black Thunder Mine. In addition, the West Jacobs Ranch tract is located just 1 mile west of the North Jacobs Ranch LBA Tract, which was recently issued as a maintenance lease to the Jacobs Ranch Mine. The results of those surveys are included within the Final South Powder River Basin Coal EIS (BLM 2003) and the Final EIS for the North Jacobs Ranch Coal Lease Application (BLM 2001b). (Note: Table 1-1 of this EIS lists the LBA tract names, the respective applicant mines, and the dates that

each maintenance coal lease was issued in the Powder River Basin since 1992.) The potential suitable habitat within the study area for the Little Thunder LBA Tract was surveyed by Intermountain Resources during the flowering period in August 2001 and no Ute ladies'-tresses were found (BLM 2003). The potential suitable habitat within the study area for the North Jacobs Ranch LBA Tract was surveyed by Intermountain Resources during the flowering period in July and August 1999 and no Ute ladies'-tresses were found (BLM 2001b).

In addition to the BAs that have been prepared to evaluate the potential effects of leasing federal coal tracts to the adjacent mines, BAs have also been prepared to address the potential effects to federally listed species by disturbing federal surface lands that are located inside the mines' existing permit areas but are outside the mines' federal coal lease boundaries. Those BAs, which have been submitted to the appropriate land management agency (i.e., USFS), document the results of field surveys in those areas, and to date, all surveys for Ute ladies'-tresses in the general Wright analysis area have resulted in negative findings.

#### G-7.1.2.5 North Porcupine

The nearest known population of Ute ladies'-tresses to the North Porcupine LBA Tract is located on an unnamed tributary of Antelope Creek in northern Converse County, roughly 28 miles west-southwest of the tract. A large portion (about 84 percent) of the North Porcupine tract is located within the Porcupine Creek watershed, which is a major tributary of Antelope Creek. Trussler and Holmes Creek watersheds drain the remainder of the tract, but they are not within the Antelope Creek watershed. No occurrences have been recorded in Campbell County, including the lands within the North Porcupine tract's general analysis area.

The potentially suitable habitat within North Porcupine tract's general analysis area and adjacent areas is found primarily along Porcupine Creek. Porcupine Creek is classified as an ephemeral stream, although surface discharge of groundwater associated with local CBNG development, which is a relatively recent phenomenon, has resulted in more persistent streamflow and generally wetter conditions within and adjacent to the stream channel throughout the year. The alluvial soils along Porcupine Creek in this area provides very little suitable habitat for Ute ladies'-tresses due to excessive saline/sodic soil properties (PRC 2009). There are several stock reservoirs within the tract's general analysis area as well, and a few playas have formed in the lowest portion of areas that do not contribute runoff to any stream. Most of the reservoirs and playas contain water only in early spring. However, if the presence of water is more persistent in some areas, potential Ute ladies'-tresses habitat may exist within the narrow riparian strips located adjacent to these features, as they furnish the appropriate vegetation such as that found along Porcupine Creek.

Prior to conducting field surveys, topographical and wetland delineation maps were reviewed to identify all areas of potentially suitable habitat where the species may occur. Suitable habitat factors included less steep stream banks, light soil texture and well drained soils, close lateral or vertical distance to a perennial water source during the flowering period, lack of plant competition, lack of general soil alkalinity/salinity, and current or historical management practices that did not promote overgrazing and extensive use of riparian areas. The 2009 surveys used past survey data and current aerial photography to refine the search areas. Pedestrian and vehicular reconnaissance was also used to search for suitable habitat. Potentially suitable habitat areas were documented using the global positioning system (GPS) and notes describing the habitat were taken during these reconnaissance surveys.

Refer to Section G-6.5 for a description of the landscape and wetland areas identified within the general analysis area for the North Porcupine tract. Within the tract's entire general analysis area, which is contained within the North Antelope Rochelle Mine's existing permit area, there are approximately 19.7 acres of jurisdictional wetlands and OWUS, including 10.2 acres of vegetated wetlands and 9.5 acres of pond and channel OWUS. The vegetated wetland areas consist primarily of palustrine emergent herbaceous wet meadow or marsh and palustrine aquatic beds located along ephemeral stream channels and around ponds, playas and depressions, whereas the OWUS consist of ephemeral stream channels and open water. Figure G-25, which was taken from North Antelope Rochelle Mine's permit (PRC 2009), depicts the wetland areas mapped within the LBA tract's general analysis area.

The entire general analysis area for the North Porcupine tract has undergone one or more vegetation baseline studies conducted for amendments to the North Antelope Rochelle Mine permit. Vegetation studies were reported in 1991, 1998, and 2001. No occurrence of the species was recorded in the 1991 vegetation study.

BKS Environmental Associates, Inc. (BKS) surveyed all areas of potentially suitable habitat on the federally owned lands (TBNG) within North Porcupine tract's general analysis area along Porcupine Creek and its tributaries on September 1 and 6, 2005 and on August 11, 2009. On the TBNG, BKS surveyed all areas of potentially suitable habitat within the tract's general analysis area along Holmes Creek on August 16, 2006 and on August 11, 2009. On the TBNG, BKS surveyed all areas of potentially suitable habitat within the tract's general analysis area along Trussler Creek on August 24, 2006, August 26, 2007, and on August 11 and 13, 2009. The species was not observed during any of these surveys that were conducted on the TBNG.

Special reconnaissance surveys for Ute ladies'-tresses were conducted by BKS in 1999, 2000, and 2009. The earlier surveys covered more than 73 percent of the North Porcupine tract's general analysis area and included the entire reach of Porcupine Creek located within the tract's general analysis area. As stated previously, the 2009 survey used information from past surveys and aerial

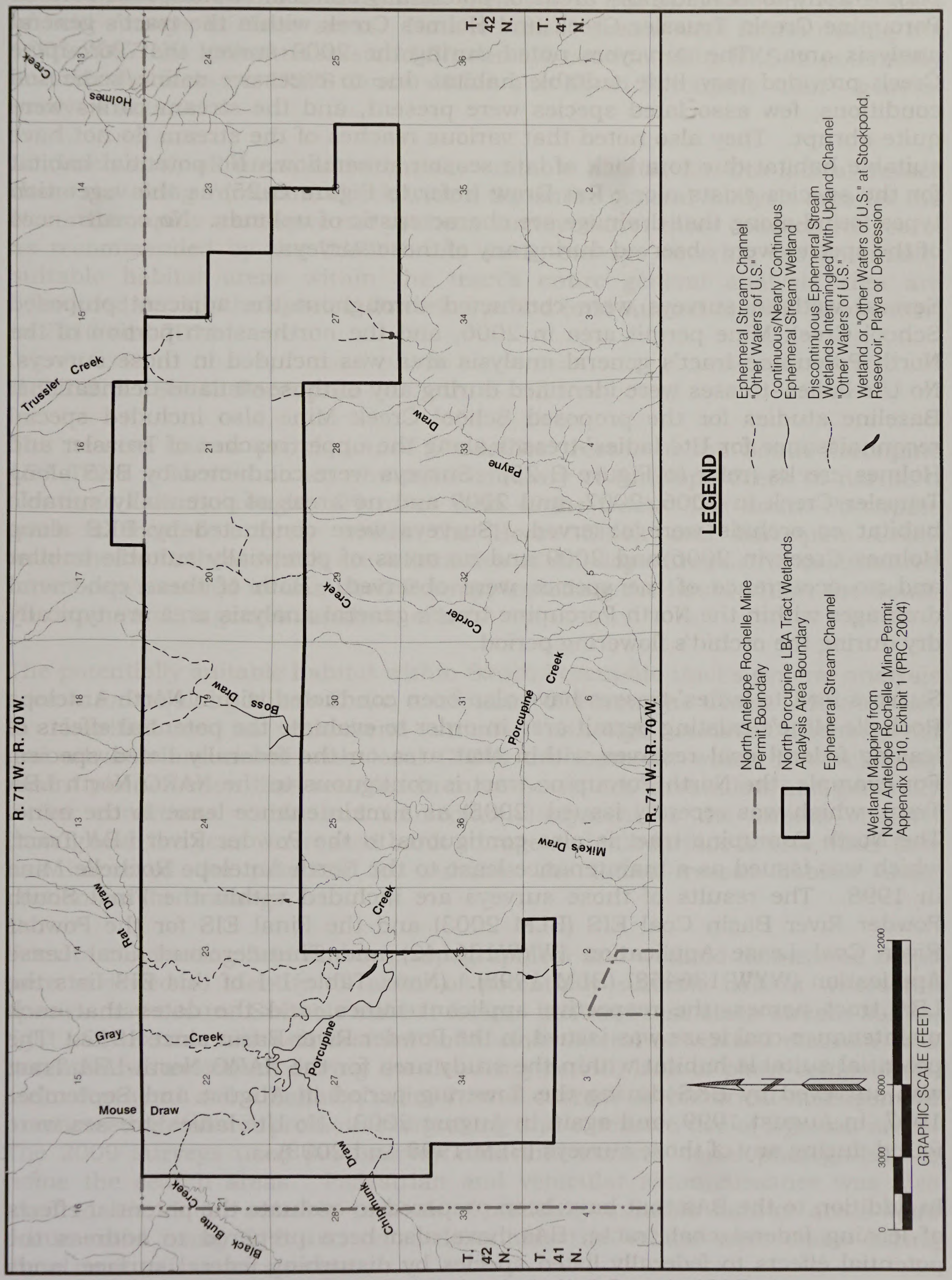


Figure G-25. Wetlands Within the General Analysis Area for the North Porcupine LBA Tract.

photography to best identify areas of potentially suitable habitat, and covered Porcupine Creek, Trussler Creek and Holmes Creek within the tract's general analysis area. The surveyors noted during the 2009 survey that Porcupine Creek provided very little suitable habitat due to excessive saline/sodic soil conditions, few associated species were present, and the stream banks were quite abrupt. They also noted that various reaches of the stream do not have suitable habitat due to a lack of late season streamflow. No potential habitat for the species exists along Rat Draw (refer to Figure G-25) as the vegetation types found along that drainage are characteristic of uplands. No occurrences of the species were observed during any of these surveys.

Several wetland surveys were conducted throughout the adjacent proposed School Creek Mine permit area in 2006, and the northeastern portion of the North Porcupine tract's general analysis area was included in those surveys. No Ute ladies'-tresses were identified during any of those wetland delineations. Baseline studies for the proposed School Creek Mine also included special reconnaissance for Ute ladies'-tresses along the upper reaches of Trussler and Holmes creeks (refer to Figure G-25). Surveys were conducted by BKS along Trussler Creek in 2006, 2007, and 2009 and no areas of potentially suitable habitat or orchids were observed. Surveys were conducted by BKS along Holmes Creek in 2006 and 2009 and no areas of potentially suitable habitat and no occurrence of the species were observed. Both of these ephemeral drainages within the North Porcupine tract's general analysis area are typically dry during the orchid's flowering period.

Surveys for Ute ladies'-tresses have also been conducted within North Antelope Rochelle Mine's existing permit area in order to evaluate the potential effects of leasing federal coal reserves within that area on the federally listed species. For example, the North Porcupine tract is contiguous to the NARO North LBA Tract, which was recently issued (2005) as a maintenance lease to the mine. The North Porcupine tract is also contiguous to the Powder River LBA Tract, which was issued as a maintenance lease to the North Antelope Rochelle Mine in 1998. The results of those surveys are included within the Final South Powder River Basin Coal EIS (BLM 2003) and the Final EIS for the Powder River Coal Lease Application (WYW136142) and Thundercloud Coal Lease Application (WYW`136458) (BLM 1998). (Note: Table 1-1 of this EIS lists the LBA tract names, the respective applicant mines, and the dates that each maintenance coal lease was issued in the Powder River Basin since 1992.) The potential suitable habitat within the study area for the NARO North LBA Tract was surveyed by BKS during the flowering period in August and September 1997, in August 1999, and again in August 2000. No Ute ladies'-tresses were found during any of those surveys (BLM 1998 and 2003).

In addition to the BAs that have been prepared to evaluate the potential effects of leasing federal coal tracts, BAs have also been prepared to address the potential effects to federally listed species by disturbing federal surface lands that are located inside the mine's existing permit area but are outside the existing federal coal lease boundaries. Those BAs, which have been submitted

to the appropriate land management agency (i.e., USFS), document the results of field surveys in those areas. No Ute ladies'-tresses were found during the 2005-2007 Ute ladies'-tresses and BA surveys conducted by BKS in potentially suitable habitats on USFS lands within the North Porcupine tract's general analysis area.

In conclusion, all areas of potentially suitable habitat for Ute ladies'-tresses that exist along Porcupine Creek within the entire general analysis area for the North Porcupine tract have not yet been surveyed over three consecutive years, as recommended by the USFWS. As such, surveys covering the potentially suitable habitat areas within the tract's entire general analysis area are scheduled during the species' flowering period (mid-August to early September) in 2010 and 2011.

#### G-7.1.2.6 South Porcupine

The nearest known population of Ute ladies'-tresses to the South Porcupine LBA Tract is located on an unnamed tributary of Antelope Creek in northern Converse County, roughly 29 miles west of the tract. The South Porcupine tract is located entirely within the Horse Creek and Porcupine Creek watersheds, both of which are tributaries of Antelope Creek. No occurrences have been recorded in Campbell County, including the lands within the South Porcupine tract's general analysis area.

The potentially suitable habitat within South Porcupine tract's general analysis area is found along Mike's Draw, a tributary of Porcupine Creek. Mike's Draw is classified as an ephemeral stream, although surface discharge of groundwater associated with local CBNG development, which is a relatively recent phenomenon, has resulted in more persistent streamflow and generally wetter conditions within and immediately adjacent to the stream channel throughout the year. Increased bank storage and subsurface lateral water flow has improved the potential for suitable Ute ladies'-tresses habitat along portions of the drainage.

Prior to conducting field surveys, topographical and wetland delineation maps were reviewed to identify all areas of potentially suitable habitat where the species may occur. Suitable habitat factors included less steep stream banks, light soil texture and well drained soils, close lateral or vertical distance to a perennial water source during the flowering period, lack of plant competition, lack of general soil alkalinity/salinity, and current or historical management practices that did not promote overgrazing and extensive use of riparian areas. The 2009 surveys used past survey data and current aerial photography to refine the search areas. Pedestrian and vehicular reconnaissance was also used to search for suitable habitat. Potentially suitable habitat areas were documented using GPS and notes describing the habitat were taken during these reconnaissance surveys.

Refer to Section G-6.6 for a description of the landscape and wetland areas identified within the general analysis area for the South Porcupine tract. Within the tract's entire general analysis area there are an estimated 12.3 acres of jurisdictional wetlands and OWUS, including 7.2 acres of vegetated wetlands and 5.1 acres of pond and channel OWUS. There are also approximately 0.2 wetland acres of non-jurisdictional playa/depressional features. The vegetated wetland areas consist primarily of palustrine emergent herbaceous wet meadow or marsh along ephemeral stream channels. Figure G-26, which was taken from North Antelope Rochelle Mine's permit (PRC 2009), depicts the wetlands mapped within the LBA tract's general analysis area.

The entire general analysis area for the South Porcupine tract has undergone one or more vegetation baseline studies conducted for amendments to the North Antelope Rochelle Mine permit. Vegetation studies were reported in 1991, 1998, and 2001. No occurrence of the species was recorded in the 1991 vegetation study.

BKS surveyed all areas of potentially suitable habitat along Mike's Draw on September 1 and 6, 2005 and on August 12, 2009. Potentially suitable habitat areas were documented using the global positioning system (GPS) and notes describing the habitat were taken during these pedestrian surveys. Past survey data and aerial photography were used to refine the search areas for the 2009 survey. Correspondence with USFS personnel confirmed that the hydrology of Mike's Draw has been affected by water discharged by local CBNG production. The habitat along Mike's Draw was considered to be marginally suitable for Ute ladies'-tresses in 2005; however, during the 2009 survey of the drainage no surface water was present, the saturation level was greater than 18 inches below ground level, and the habitat was found to be poor to non-existent. A CBNG discharge outfall point was noted along the drainage but it appeared to no longer be discharging. No orchids were observed during any of these surveys.

Surveys for Ute ladies'-tresses have also been conducted within North Antelope Rochelle Mine's existing permit area in order to evaluate the potential effects of leasing federal coal reserves within that area on the federally listed species. For example, the South Porcupine tract is contiguous to the NARO North and NARO South LBA Tracts, which were recently issued (2005 and 2004, respectively) as maintenance leases to the mine. The South Porcupine tract is also contiguous to the Powder River LBA Tract, which was issued as a maintenance lease to the North Antelope Rochelle Mine in 1998. The results of those surveys are included within the Final South Powder River Basin Coal EIS (BLM 2003) and the Final EIS for the Powder River Coal Lease Application (WYW136142) and Thundercloud Coal Lease Application (WYW`136458) (BLM 1998). (Note: Table 1-1 of this EIS lists the LBA tract names, the respective applicant mines, and the dates that each maintenance coal lease was issued in the Powder River Basin since 1992.) The potential suitable habitat within the study area for the NARO North and NARO South LBA Tracts was surveyed by

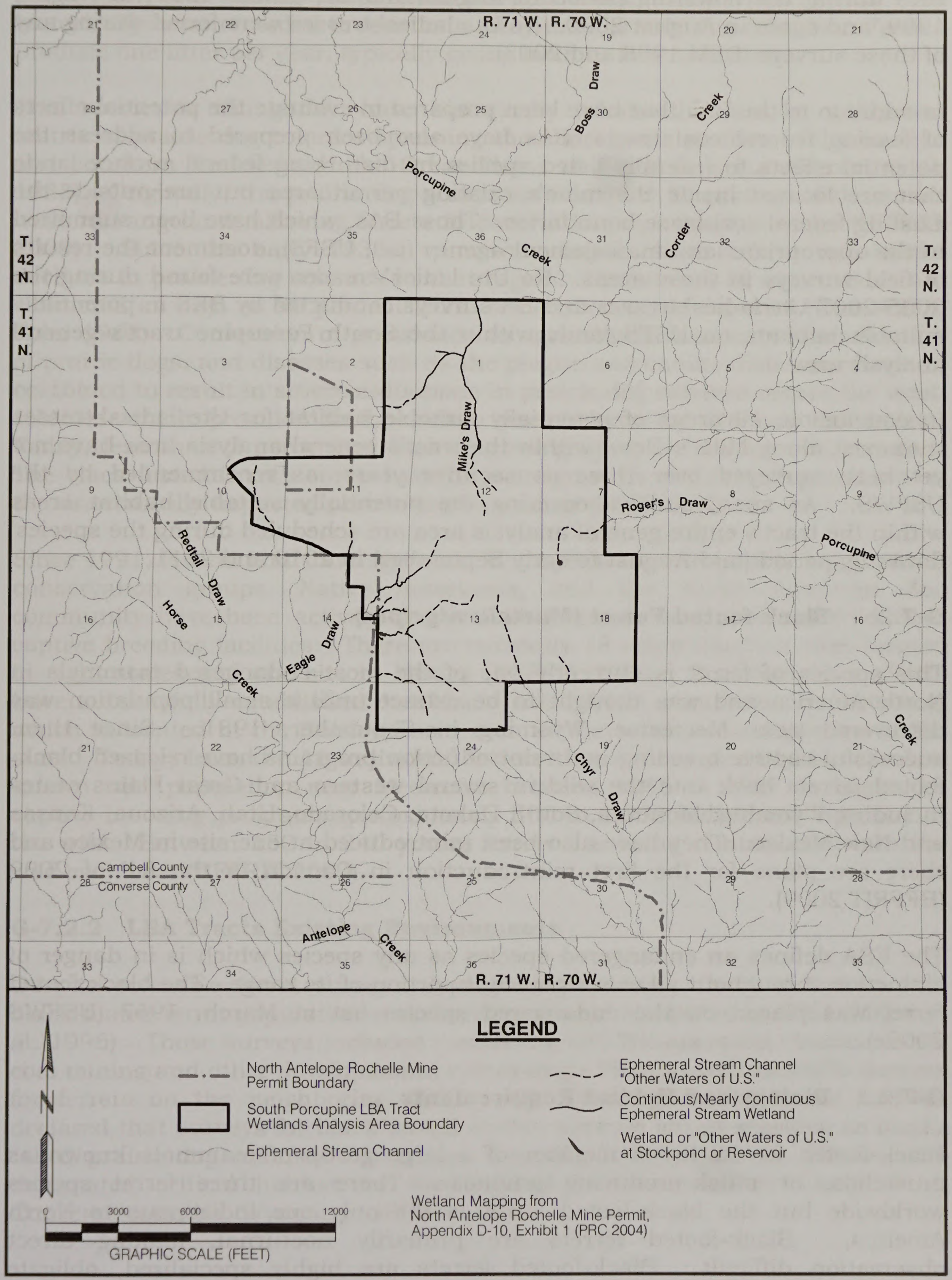


Figure G-26. Wetlands Within the General Analysis Area for the South Porcupine LBA Tract.

BKS during the flowering period in August and September 1997, in August 1999, and again in August 2000. No Ute ladies'-tresses were found during any of those surveys (BLM 1998 and 2003).

In addition to the BAs that have been prepared to evaluate the potential effects of leasing federal coal tracts, BAs have also been prepared to address the potential effects to federally listed species by disturbing federal surface lands that are located inside the mine's existing permit area but are outside the existing federal coal lease boundaries. Those BAs, which have been submitted to the appropriate land management agency (i.e., USFS), document the results of field surveys in those areas. No Ute ladies'-tresses were found during the 2005-2007 Ute ladies'-tresses and BA surveys conducted by BKS in potentially suitable habitats on USFS lands within the South Porcupine tract's general analysis area.

In conclusion, all areas of potentially suitable habitat for Ute ladies'-tresses that exist along Mike's Draw within the tract's general analysis area have not yet been surveyed over three consecutive years, as recommended by the USFWS. As such, surveys covering the potentially suitable habitat areas within the tract's entire general analysis area are scheduled during the species' flowering period (mid-August to early September) in 2010 and 2011.

## G-7.2 Black-footed Ferret (*Mustela nigripes*)

This species of ferret is currently one of the most endangered mammals in North America and was thought to be extinct until a small population was discovered near Meeteetse, Wyoming in September, 1981. Since then, successful captive breeding and reintroduction programs have released black-footed ferrets back into the wild in several western and Great Plains states including Wyoming, Montana, South Dakota, Colorado, Utah, Arizona, Kansas and New Mexico. They have also been reintroduced at one site in Mexico and there are plans for the first reintroduction in Canada in the fall of 2009 (BFFRIT 2009).

The ESA defines an endangered species as any species which is in danger of extinction throughout all or a significant portion of its range. The black footed ferret was placed on the endangered species list in March, 1967 (USFWS 2009e).

### G-7.2.1 Biology and Habitat Requirements

Black-footed ferrets are a member of a large group of mammals known as mustelids, or musk-producing animals. There are three ferret species worldwide but the black-footed ferret is the only one indigenous to North America. Black-footed ferrets are primarily nocturnal, making direct observation difficult. Black-footed ferrets are highly specialized, obligate carnivores of the prairie dog (*Cynomys* spp.). They depend almost exclusively on prairie dogs for food and they also use prairie dog burrows for shelter,

parturition, and raising young (Hillman and Clark 1980). Few ferrets have historically been recorded in locations away from prairie dog colonies. Ferrets produce one litter per year, typically giving birth to four or five kits.

This species is thought to have historically inhabited a nearly contiguous matrix of prairie dog colonies spanning the short-grass prairies of the eastern and southern Rockies and the Great Plains of North America (Forrest et al. 1985). Originally, the prairie dog ecosystem occupied 20 percent of the entire western rangeland, allowing ferrets to cover a large geographic range (BFFRIT 2009). Since the early 1930s, numerous factors have led to substantial declines in prairie dog colonies in that region. Reductions in some states are estimated as high as 90 percent from formerly occupied colonies (Rose 1973, Tyler 1968). Conversion of grasslands to agricultural landscapes, eradication of prairie dogs, and diseases such as the plague and canine distemper have all combined to result in severe reductions in prairie dog colonies across the west, colonies which provided food, shelter, and habitat for black-footed ferrets. Today, less than 2 percent of their original geographic distribution remains. The black-footed ferret's current status is a sign of its exclusive dependence on the dramatically impacted prairie dog ecosystem (BFFRIT 2009).

Since 1991, federal and state agencies, in cooperation with private landowners, conservation groups, Native Americans, and the North American Zoo community have been actively reintroducing ferrets back into the wild from captive breeding facilities. There are currently 18 reintroduction sites located in eight states and one site in Mexico (BFFRIT 2009). Reintroduction efforts have successfully established one black-footed ferret population in Wyoming, which is located in the Shirley Basin area in the south-central portion of the state. Today, from the 18 individual ferrets that were captured from the last known wild population near Meeteetse between 1985 to 1987 to begin the captive breeding program, approximately 800 to 1,000 individuals now live in the wild. Between 150 to 240 young ferrets are being reintroduced into the wild each year (BFFRIT 2009).

### G-7.2.2 LBA Tracts Existing Environments

Despite extensive ferret surveys throughout Wyoming, the last known wild black-footed ferret population was discovered near Meeteetse in 1981 (Miller et al. 1996). Those surveys included numerous USFWS-approved clearances for coal mining and other development in Wyoming's PRB, as well as USFS surveys for ferrets on the neighboring TBNG. On February 2, 2004, the USFWS declared that surveys for black-footed ferrets were no longer required in black-tailed prairie dog colonies throughout Wyoming (USFWS 2004). There is no designated critical habitat for black-footed ferrets in either Campbell or Converse counties, Wyoming (USFWS 2008).

### G-7.2.2.1 North Hilight Field

The Black Thunder Mine and North Hilight Field LBA Tract's general analysis area are beyond the focus area for ferret reintroduction efforts on the TBNG and elsewhere in the general region (USFS 2002b, Grenier 2003).

While the general analysis area for the North Hilight Field LBA Tract and its 2-mile wildlife study area (Figure G-15) harbor some small prairie dog colonies, black-footed ferrets have never been documented at the mine, nor the surrounding region, during surveys conducted over the last 30 plus years (1976 to present) by a variety of private, state, and federal entities. No black-footed ferret observations or scat have ever been documented in this LBA tract's wildlife study area.

Currently, four black-tailed prairie dog colonies encompassing a total of approximately 53.8 non-contiguous acres are located within 2 miles of the North Hilight Field tract (Figure G-15). Of which, two colonies occur within the general analysis area itself and are approximately 3.4 and 19.5 acres in size. The other two colonies located in the surrounding 2-mile survey area are approximately 3.7 and 27.2 acres in size. All of these colonies were occupied during 2007. None of these four colonies within the 2-mile wildlife study area meet the 120-acre minimum threshold for supporting a breeding female ferret and her litter (Forrest et al. 1985) and none meet the 80-acre minimum requirement for black-footed ferret habitat (USFWS 1989).

### G-7.2.2.2 South Hilight Field

The Black Thunder Mine and South Hilight Field LBA Tract's general analysis area are beyond the focus area for ferret reintroduction efforts on the TBNG and elsewhere in the general region (USFS 2002b, Grenier 2003).

While the general analysis area for the South Hilight Field LBA Tract and its 2-mile wildlife study area (Figure G-16) harbor some small prairie dog colonies, black-footed ferrets have never been documented at the mine, nor the surrounding region, during surveys conducted over the last 30 plus years (1976 to present) by a variety of private, state, and federal entities. No black-footed ferret observations or scat have ever been documented in this LBA tract's wildlife study area.

Currently, seven black-tailed prairie dog colonies encompassing a total of approximately 177.2 non-contiguous acres are located within 2 miles of the South Hilight Field tract (Figure G-16). Of which, just one colony occurs within the general analysis area itself and it is less than 1 acre in size. The other six colonies are located within or partially within the surrounding 2-mile survey area and range in size from approximately 2.0 to 89.1 acres. All of these colonies were occupied during 2007. None of these seven colonies within the 2-mile wildlife study area meet the 120-acre minimum threshold for supporting

a breeding female ferret and her litter (Forrest et al. 1985), and one colony does meet the 80-acre minimum requirement for black-footed ferret habitat (USFWS 1989).

#### G-7.2.2.3 West Hilight Field

The Black Thunder Mine and West Hilight Field LBA Tract's general analysis area are beyond the focus area for ferret reintroduction efforts on the TBNG and elsewhere in the general region (USFS 2002b, Grenier 2003).

While the general analysis area for the West Hilight Field LBA Tract and its 2-mile wildlife study area (Figure G-17) harbor some small prairie dog colonies, black-footed ferrets have never been documented at the mine, nor the surrounding region, during surveys conducted over the last 30 plus years (1976 to present) by a variety of private, state, and federal entities. No black-footed ferret observations or scat have ever been documented in this LBA tract's wildlife study area.

Currently, eight black-tailed prairie dog colonies encompassing a total of approximately 167.5 non-contiguous acres are located within 2 miles of the West Hilight Field tract (Figure G-17). Of which, one colony occurs within the general analysis area itself and it is approximately 89.1 acres in size. The other seven colonies are located within the surrounding 2-mile survey area and range in size from approximately 0.1 to 27.2 acres. All of these colonies were occupied during 2007. None of these eight colonies within the 2-mile wildlife study area meet the 120-acre minimum threshold for supporting a breeding female ferret and her litter (Forrest et al. 1985). One colony does meet the 80-acre minimum requirement for black-footed ferret habitat (USFWS 1989).

#### G-7.2.2.4 West Jacobs Ranch

The Jacobs Ranch Mine and West Jacobs Ranch LBA Tract's general analysis area are beyond the focus area for ferret reintroduction efforts on the TBNG and elsewhere in the general region (USFS 2002b, Grenier 2003).

While the general analysis area for the West Jacobs Ranch LBA Tract and its 2-mile wildlife study area (Figure G-18) harbor some small prairie dog colonies, black-footed ferrets have never been documented at the mine, nor the surrounding region, during surveys conducted over the last 30 plus years (1976 to present) by a variety of private, state, and federal entities. No black-footed ferret observations or scat have ever been documented in this LBA tract's wildlife study area.

Currently, six black-tailed prairie dog colonies encompassing a total of approximately 78.3 non-contiguous acres are located within 2 miles of the West Jacobs Ranch tract (Figure G-18). Of these, only one colony occurs within the general analysis area itself and is approximately 17.9 acres in size.

The other five colonies located in the surrounding 2-mile survey area range in size from approximately 2.6 to 27.2 acres in size. All of these colonies were occupied during 2007. None of these six colonies within the 2-mile wildlife study area meet the 120-acre minimum threshold for supporting a breeding female ferret and her litter (Forrest et al. 1985) and none meet the 80-acre minimum requirement for black-footed ferret habitat (USFWS 1989).

### G-7.2.2.5 North Porcupine

The North Antelope Rochelle Mine and North Porcupine LBA Tract's general analysis area are beyond the focus area for ferret reintroduction efforts on the TBNG and elsewhere in the general region (USFS 2002b, Grenier 2003).

While the general analysis area for the North Porcupine LBA Tract and its 2-mile wildlife study area (Figure G-19) harbor some small prairie dog colonies, black-footed ferrets have never been documented at the mine, nor the surrounding region, during surveys conducted over the last 30 plus years (1976 to present) by a variety of private, state, and federal entities. No black-footed ferret observations or scat have ever been documented in this LBA tract's wildlife study area.

Currently, 17 black-tailed prairie dog colonies encompassing a total of approximately 1,211.4 non-contiguous acres are located within 2 miles of the North Porcupine tract (Figure G-19). Of which, only one colony occurs within the general analysis area itself and it is approximately 18.6 acres in size. The other 16 colonies located in the surrounding 2-mile survey area range in size from approximately 1.5 to 345.3 acres in size. All of these colonies were occupied during 2007. Of these 17 colonies, the three largest in size meet the 120-acre minimum threshold for supporting a breeding female ferret and her litter (Forrest et al. 1985) and the 80-acre minimum requirement for black-footed ferret habitat (USFWS 1989). These three colonies are 228.9 acres, 338.1 acres, and 345.3 acres in size.

### G-7.2.2.6 South Porcupine

The North Antelope Rochelle Mine and South Porcupine LBA Tract's general analysis area are beyond the focus area for ferret reintroduction efforts on the TBNG and elsewhere in the general region (USFS 2002b, Grenier 2003).

While the general analysis area for the South Porcupine LBA Tract and its 2-mile wildlife study area (Figure G-20) harbor some small prairie dog colonies, black-footed ferrets have never been documented at the mine, nor the surrounding region, during surveys conducted over the last 30 plus years (1976 to present) by a variety of private, state, and federal entities. No black-footed ferret observations or scat have ever been documented in this LBA tract's wildlife study area.

Currently, 10 black-tailed prairie dog colonies encompassing a total of approximately 476.3 non-contiguous acres are located within 2 miles of the South Porcupine tract (Figure G-20). Of which, no colonies occur within the general analysis area itself. These 10 colonies are all located in the surrounding 2-mile survey area and range in size from approximately 1 acre to 345.3 acres. All of these colonies were occupied during 2007. The largest colony is located within the wildlife survey area for both the North and South Porcupine tracts (Figures G-19 and G-20), and only this colony meets the 120-acre minimum threshold for supporting a breeding female ferret and her litter (Forrest et al. 1985) and the 80-acre minimum requirement for black-footed ferret habitat (USFWS 1989).

### G-7.3 Blowout Penstemon (*Penstemon haydenii*)

Blowout penstemon, a member of the *Scrophulariaceae* (Figwort) family, was listed under the ESA by the USFWS as endangered on October 1, 1987 and is one of Wyoming's rarest native plants. The blowout penstemon was first discovered in the Nebraska Sandhills, where it was known in large numbers through 1914, but by the 1940s they had decreased dramatically (Heidel et al. 2007). The plant was actually considered extinct by 1940 but was rediscovered in 1968 (Stubbendieck and Kottas 2007). This perennial herb was first discovered in Wyoming in 1877 in an area of prominent sand dunes located between Casper and Rawlins, and then rediscovered in the same general area by a BLM botanist in 1996 (Heidel et al. 2007).

The blowout penstemon is a regional endemic species of the Sandhills of west-central Nebraska and the northeastern edge of the Great Divide Basin in Wyoming. In Wyoming, the species is currently known from just three populations, which all occur in the Ferris Dunes area near the Ferris and Seminoe Mountains located in the northwestern part of Carbon County (BLM 2005). The three known populations are subdivided into at least eight subpopulations that occupy about 80 acres within five square miles (Fertig 2001). Currently, several thousand individual plants make up the three Wyoming populations (Heidel et al. 2007).

The ESA defines an endangered species as any species which is in danger of becoming extinct throughout all or a significant portion of its range. The blowout penstemon was listed as endangered due to a variety of factors including the small geographic range of existing plants, the possibility of localized droughts to severely impact entire populations, and habitat loss and modification (Stubbendieck and Kottas 2007).

There is no designated critical habitat for blowout penstemon in Wyoming (USFWS 2008); however, USFWS approved a recovery plan in 1992 (Fritz et al. 1992). At the time of the recovery plan's publication, there were no known occurrences of the species in Wyoming. Therefore, the recovery plan focuses on habitat protection in Nebraska (BLM 2005).

### G-7.3.1 Biology and Habitat Requirements

Blowout penstemon is a perennial herb that grows 1-2 feet high. Vegetative stems are usually less than 30 centimeters (12 inches) tall and have greenish-glue, waxy, linear leaves. Flowering stems have narrow, linear leaves at the base, and broad, waxy leaves that taper to a narrow tip. The inflorescence is 6-16 centimeters (2-6 inches) long and has six to ten compact leafy whorls of milky-blue to pale lavender flowers. The flowers are 1-1½-inch long, arranged in clusters around a tall flowering stem and produce a faint, vanilla-like scent.

Blowout penstemon begins spring growth in late March or early April from buds on the lower stems formed the previous year. Plants will typically bloom from late May through early July and set fruit in July and August. Individual plants are typically in bloom for 3-4 weeks (Stubbendieck and Kottas 2007). When in bloom in Wyoming in June and July, its blue or lavender flowers stand out against other sparse vegetation found in and around sandy blowouts. The flowers are typically cross-pollinated by many different insects, in including twenty-six species of solitary bees and one bee-like wasp, as well as beetles, ants, and butterflies (Stubbendieck and Kottas 2007 and Heidel et al. 2007). Once pollinated, the flowers ripen into ½-inch long capsule-like fruits, each containing twenty to thirty light-brown, disc-shaped seeds (Stubbendieck and Kottas 2007, BLM 2005, and University of Wyoming 2008). Mature fruits dry and split open by late August to September and seeds fall to the ground throughout the fall and winter. While some insects, birds and small mammals feed on the seeds, the rest are blown along the ground surface until they are covered with sand. Buried seeds remain viable and for natural seed germination to occur and for seedling roots to reach a depth where moisture is constantly available, blowout sand must remain damp for at least two weeks, conditions that do not occur every year (Stubbendieck and Kottas 2007). Once a plant germinates, it can live for several years, but may not flower every year (Heidel et al. 2007).

Blowout penstemon is a pioneer species, one of the first plants to establish itself, on sand dunes and sandy aprons (Heidel et al. 2007). The blowout penstemon's habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind erosion (Fertig 2001). The species is most common in the open, sandy habitats or wind-excavated depressions (crater-like blowouts) in dune tops. The plant is a primary invader that does not persist when a blowout becomes completely vegetated (BLM 2005). Wind erosion is important in maintaining the open habitat required by blowout penstemon. The blowout community contains plants especially tolerant of disturbance caused by wind erosion as blowout sand is excavated and wind-driven (Stubbendieck and Kottas 2007). In Wyoming, blowout penstemon is found in sparsely vegetated sandy blowouts in the early stages of plant community development. On unstable, windward slopes, blowout penstemon is typically found with communities of blowout grass *(Redfieldia flexuosa)*, lemon scurfpea *(Psoralidium lanceolatum)*, and thickspike wheatgrass *(Elymus lanceolatus)* or Indian ricegrass *(Achnatherum hymenoides)* with less

than 5 percent cover. Populations on more stable, lee slopes occur in similar communities with vegetative cover between 15 and 40 percent (BLM 2005).

Shifting sand dunes are prevented from becoming fully stabilized and overgrown because of wind and gravity. The dunes may be 60 to 120 feet high on typically steep slopes at elevations between 5,800 and 7,500 feet. The absence of blowout penstemon from other active blowouts and gently undulating sand dune fields found in central and eastern Wyoming is likely due to a lack of soil moisture during the growing season and the stage in development of local plant communities (Heidel et al. 2007).

### G-7.3.2 LBA Tracts Existing Environments

The general Wright analysis area is located approximately 150 miles northwest of the known occurrences in the Nebraska Sandhills and approximately 150 miles northeast of the three known populations in Carbon County, Wyoming. Fertig (2001) identified areas of potential habitat for blowout penstemon in Wyoming in the Killpecker Sand Dunes of north-central Sweetwater County, the Green Mountains in southeast Fremont County, the Sandhills in southwestern Carbon County, and the Ferris Mountain/Seminoe Mountain area in northern Carbon County (BLM 2005). There have been some extensive surveys in potential habitat recently that have not turned up any new populations (BLM 2005). No occurrences have been recorded in Campbell County, and there is no designated critical habitat for blowout penstemon in Wyoming (USFWS 2008).

In order to determine if and where areas of suitable habitat for the species exist within each WAC LBA tract's general analysis area, references were made to the published geologic maps and soil surveys that cover the general Wright analysis area.

The Powder River Basin is underlain by the sedimentary deposits of the Eocene age Wasatch Formation, which consists mainly of soft shale, sandstone and coal beds, and most of these rocks weather to fine-grained, unconsolidated surficial material. The surface of the basin is largely covered by the residual, colluvial, and eolian (arranged by the wind) deposits derived from the Wasatch. The mode of transportation and deposition accounts for the position of these weathered materials. Wind, being the most prevalent mode of transportation in this area, accounts for the transport and deposition of most of the unconsolidated deposits, which are depicted on the U.S. Geological Survey's *Surficial Geologic Map of the Reno Junction 30' × 60' Quadrangle, Campbell and Weston Counties, Wyoming* (Reheis and Coates 1987) as "eolian mix." However, these areally extensive "eolian mix" deposits are predominantly very fine-grained, silt- and clay-sized particles and are largely stabilized with vegetation. The Wyoming State Geological Survey's *Preliminary Geologic Map of the Reno Junction 30' × 60' Quadrangle, Campbell and Weston Counties, Wyoming* (Ver Ploeg and Boyd 2003) is more specific and depicts "windblown sand" deposits, which are described as "loose particles of quartz, mainly from poorly lithified

outcrops of Wasatch Formation, and silt deposited in dunes and sheets downwind from sources areas."

Major factors involved in the formation of soils include whether or not the material was transported and how the material was weathered during transportation. Four primary soil formation processes causing different soil types in the general Wright analysis area were noted: 1) those soils developing predominantly in thin residuum from sandstone or shale on upland ridges, 2) those soils developing predominantly in slopewash, colluvium, or alluvial fan deposits from mixed sources on gently sloping uplands, 3) those soils developing predominantly in coarse-textured alluvium or sandy eolian deposits on rolling uplands, and 4) drainage soils developing in mixed stream laid alluvium on terraces and channels and in fine-textured playa deposits in depressions and closed basins. The major soils series encountered during the soils surveys were grouped according to these four primary soil formation processes. Refer to Section 3.8 in this EIS for a description of the soils surveys covering the six WAC LBA tracts' general analysis areas.

The results of the suitable habitat evaluations for each WAC LBA tract are included within the following subsections.

#### G-7.3.2.1 North Hilight Field

Geologic mapping by Ver Ploeg and Boyd (2003) indicates that two separate areas of windblown sand deposits totaling less than 100 acres in size are present at the north-central and northeastern edge of the tract's general analysis area (Figure G-27). Of the 17 soil series that were mapped within the coarse-textured alluvium or sandy eolian deposits on rolling uplands, one (the "Keeline-Tullock loamy sands") is associated with soil textures that are predominantly sand. No active, shifting sand dune features were mapped during the soils surveys. The windblown sand deposits and sandy soils that are present are stabilized with vegetation. No areas of potentially suitable habitat for the blowout penstemon (sparsely vegetated, early successional, shifting sand dunes and blowout depressions) have been identified within the tract's general analysis area.

No blowout penstemon or plants commonly associated with the species (blowout grass, lemon scurfpea and thickspike wheatgrass) were found during the vegetation survey that was conducted in 2007 by Habitat Management, Inc.

#### G-7.3.2.2 South Hilight Field

Geologic mapping by Ver Ploeg and Boyd (2003) indicates that there are no areas of windblown sand deposits present within the tract's general analysis area (Figure G-27). Of the eight soil series that were mapped within the coarse-textured alluvium or sandy eolian deposits on rolling uplands, none are associated with soil textures that are predominantly sand, but rather, they are described as sandy loams. No active, shifting sand dune features were mapped

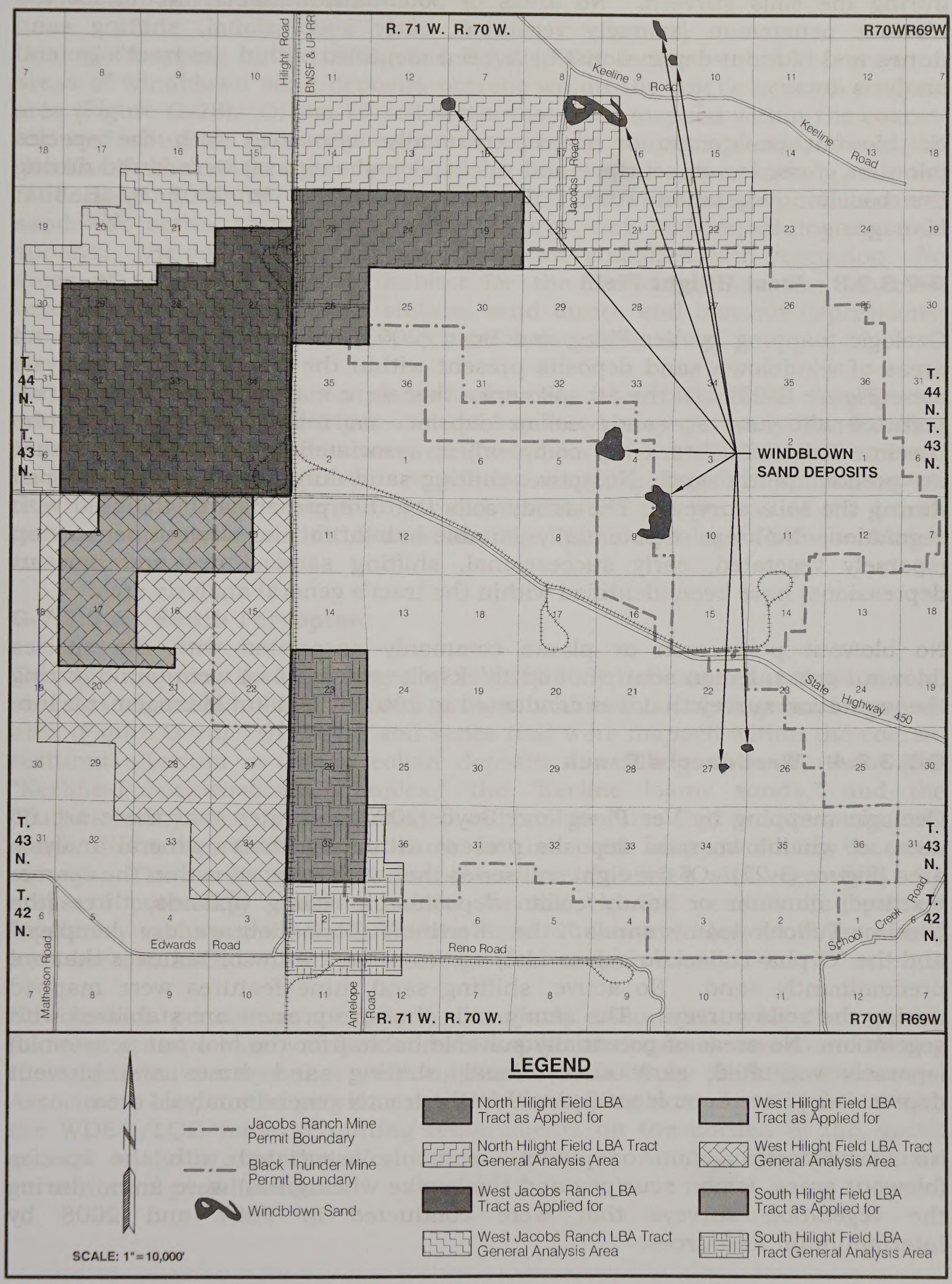


Figure G-27. Windblown Sand Deposits Within and Near the General Analysis Area for the North Hilight Field, South Hilight Field, West Hilight Field, and West Jacobs Ranch LBA Tracts.

during the soils surveys. No areas of potentially suitable habitat for the blowout penstemon (sparsely vegetated, early successional, shifting sand dunes and blowout depressions) have been identified within the tract's general analysis area.

No blowout penstemon or plants commonly associated with the species (blowout grass, lemon scurfpea and thickspike wheatgrass) were found during the baseline vegetation survey that was conducted in 2007 by Habitat Management, Inc.

#### G-7.3.2.3 West Hilight Field

Geologic mapping by Ver Ploeg and Boyd (2003) indicates that there are no areas of windblown sand deposits present within the tract's general analysis area (Figure G-27). Of the 10 soil series that were mapped within the coarse-textured alluvium or sandy eolian deposits on rolling uplands, one (the "Keeline-Tullock-Niobrara dry complex") is associated with soil textures that are predominantly sand. No active, shifting sand dune features were mapped during the soils surveys. The sandy soils that are present are stabilized with vegetation. No areas of potentially suitable habitat for the blowout penstemon (sparsely vegetated, early successional, shifting sand dunes and blowout depressions) have been identified within the tract's general analysis area.

No blowout penstemon or plants commonly associated with the species (blowout grass, lemon scurfpea and thickspike wheatgrass) were found during the vegetation survey that was conducted in 2007 by Habitat Management, Inc.

#### G-7.3.2.4 West Jacobs Ranch

Geologic mapping by Ver Ploeg and Boyd (2003) indicates that there are no areas of windblown sand deposits present within the tract's general analysis area (Figure G-27). Of the eight soil series that were mapped within the coarse-textured alluvium or sandy eolian deposits on rolling uplands, three (the "Keeline-Tullock loamy sands," the "Keeline-Tullock-Niobrara dry complex," and the "Orpha-Tullock loamy sands") are associated with soil textures that are predominantly sand. No active, shifting sand dune features were mapped during the soils surveys. The sandy soils that are present are stabilized with vegetation. No areas of potentially suitable habitat for the blowout penstemon (sparsely vegetated, early successional, shifting sand dunes and blowout depressions) have been identified within the tract's general analysis area.

No blowout penstemon or plants commonly associated with the species (blowout grass, lemon scurfpea and thickspike wheatgrass) were found during the vegetation surveys that were conducted in 2007 and 2008 by Intermountain Resources.

### G-7.3.2.5 North Porcupine

Geologic mapping by Ver Ploeg and Boyd (2003) indicates that there are no areas of windblown sand deposits present within the tract's general analysis area (Figure G-28). Of the 19 soil series that were mapped within the coarse-textured alluvium or sandy eolian deposits on rolling uplands, three (the "Keeline-Tullock-Niobrara complex," the "Keeline loamy sands," and the "Tullock loamy sands") are associated with soil textures that are predominantly sand. No active, shifting sand dune features were mapped during the soils surveys. The sandy soils that are present are stabilized with vegetation. No areas of potentially suitable habitat for the blowout penstemon (sparsely vegetated, early successional, shifting sand dunes and blowout depressions) have been identified within the tract's general analysis area.

No blowout penstemon or plants commonly associated with the species (blowout grass, lemon scurfpea and thickspike wheatgrass) were found during the vegetation surveys that were conducted in 2008 by BKS Environmental Associates, Inc., or the previous vegetation mapping done in accordance with the WDEQ/LQD mine permitting requirements on the portion of the tract's general analysis area that lies within the North Antelope Rochelle Mine's current mine permit area.

### G-7.3.2.6 South Porcupine

Geologic mapping by Ver Ploeg and Boyd (2003) indicates that there are no areas of windblown sand deposits present within the tract's general analysis area (Figure G-28). Of the 19 soil series that were mapped within the coarse-textured alluvium or sandy eolian deposits on rolling uplands, three (the "Keeline-Tullock-Niobrara complex," the "Keeline loamy sands," and the "Tullock loamy sands") are associated with soil textures that are predominantly sand. No active, shifting sand dune features were mapped during the soils surveys. The sandy soils that are present are stabilized with vegetation. No areas of potentially suitable habitat for the blowout penstemon (sparsely vegetated, early successional, shifting sand dunes and blowout depressions) have been identified within the tract's general analysis area.

No blowout penstemon or plants commonly associated with the species (blowout grass, lemon scurfpea and thickspike wheatgrass) were found during the vegetation surveys that were conducted in 2008 by BKS Environmental Associates, Inc., or the previous vegetation mapping done in accordance with the WDEQ/LQD mine permitting requirements on the portion of the tract's general analysis area that lies within the North Antelope Rochelle Mine's current mine permit area.

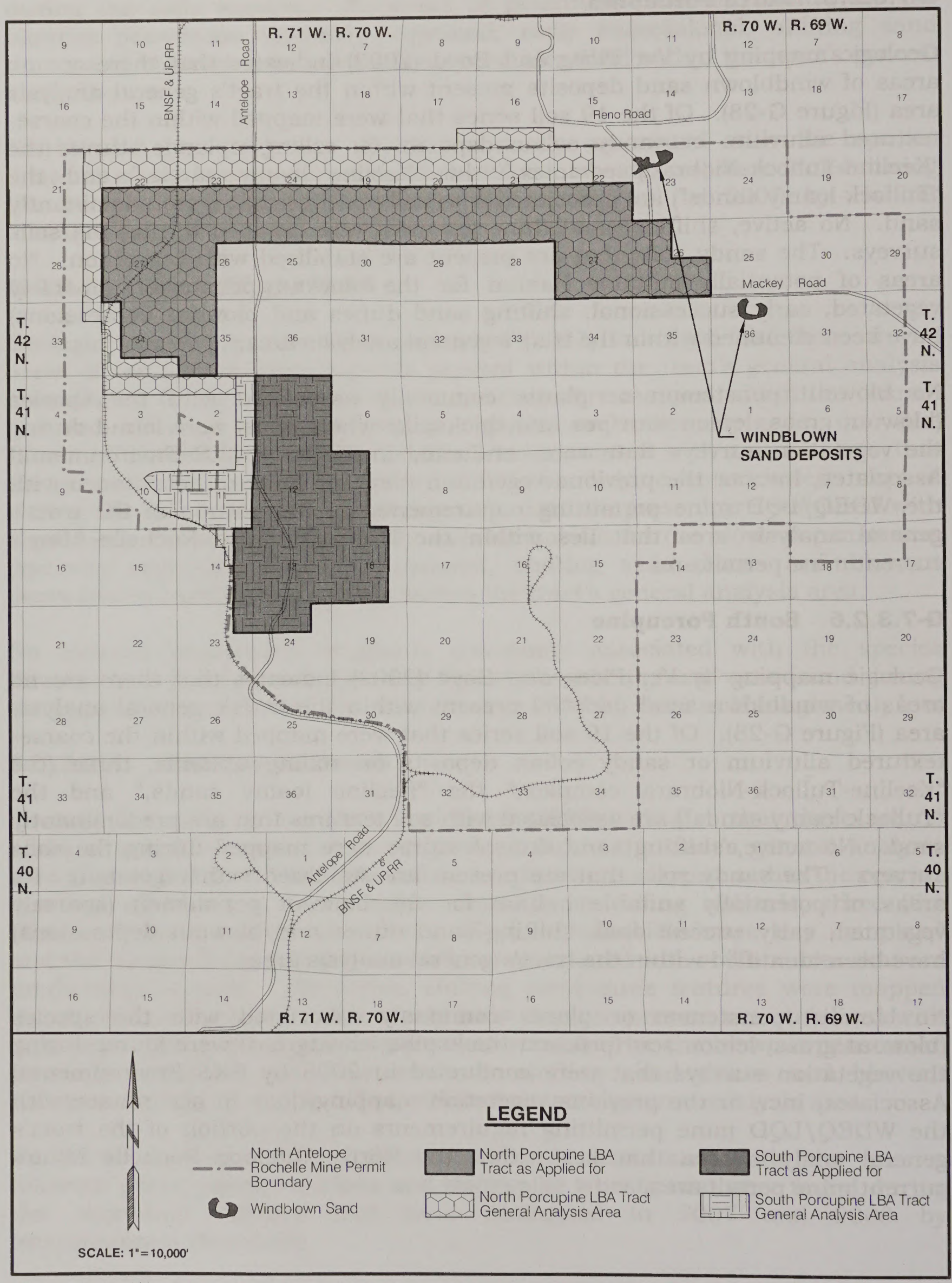


Figure G-28. Windblown Sand Deposits Within and Near the General Analysis Area for the North Porcupine and South Porcupine LBA Tracts.

## G-8.0 DIRECT AND INDIRECT IMPACTS OF THE PROPOSED ACTIONS AND ALTERNATIVES

The following subsections evaluate the direct and indirect impacts of BLM's Proposed Action and Preferred Alternative with respect to each WAC LBA tract on the Ute ladies'-tresses, the black-footed ferret, and the blowout penstemon.

As stated in Section G-1.1 above, the LBA tracts that are offered for lease would be subject to standard and special lease stipulations (which are listed in Appendix D of this EIS) that would be attached by BLM to the lease. As stated in the special stipulation developed for T&E, candidate, or other special status plant and animal species: *"... the Authorized Officer may require modifications to, or disapprove a proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed T&E species, or result in the destruction or adverse modification of designated or proposed critical habitat."* Furthermore, *"... the lessee shall comply with instructions from the Authorized Officer of the Office of Surface Mining Reclamation and Enforcement, or his designated representative, for all ground disturbing activities taking place within an approved mining and reclamation permit area or associated with such a permit."*

For the WAC LBA tracts that include National Forest System Lands, USFS will also attach special stipulations to the leases (which are listed in Appendix D of this EIS). With respect to T&E species, USFS is responsible for assuring that the leased land is examined prior to surface disturbance activities to determine effects upon any T&E plant or animal species or their habitats. *"The findings of this examination may result in some restriction to the operator's plan or even disallow use and occupancy that would be in violation to the ESA by detrimentally affecting T&E species or their habitats."*

### G-8.1 Ute Ladies'-tresses

Potentially suitable habitats for this species are very limited in the general Wright analysis area. This species has never been documented to occur in this area and the likelihood of it occurring is low due to the following reasons: 1) this area is typical of the semi-arid high plains and there are no perennial streams present, 2) very few moist riparian meadow areas are present, and 3) the transition between the narrow riparian strips along stream, reservoir and playa margins and the upland vegetation is abrupt.

#### G-8.1.1 North Hilight Field

Under the Proposed Action for the North Hilight Field LBA Tract, up to 5,053.0 acres would be disturbed by surface coal mining operations over a period of 2.0 years. Under Alternative 2, BLM's Preferred Alternative, for the North Hilight Field LBA Tract, up to 12,908.8 acres would be disturbed by surface coal mining operations over a period of 4.8 years. Although the total disturbance

acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined.

Direct effects of mining would be the removal of any potentially suitable habitat areas that are located within the mine's disturbance limits. Indirect effects of mining would be associated primarily with hydrological changes resulting from the alteration of natural stream flows and dynamics that could affect other nearby favorable orchid habitat conditions and/or unknown populations. If there are any unknown occurrences within and near the general Wright analysis area that would not be directly impacted by surface disturbance, dust from mining activities could affect those plants by reducing their vigor and reproduction capability. General habitat fragmentation would occur, which may result in effects to pollinators and disruption of seed dispersal.

Livestock grazing is currently the primary land use, while oil and gas production and recreation are secondary land uses. As such, roughly 3 percent of the LBA tract's general analysis area is presently disturbed by roads, areas surrounding active construction sites, ranching-related facilities, oil and gas well sites, and oil and gas production-related facilities. Several reservoirs recently constructed for containment of CBNG discharge water are also present.

No Ute ladies'-tresses have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. It is unlikely that orchid populations would remain undetected during multiple surveys over multiple consecutive years, if they are present in the area. Nonetheless, if undetected populations are present on the potentially suitable habitat in the general analysis area, they would be lost due to surface disturbing activities.

Given the presence of potentially suitable habitat within the tract's general analysis area, there is a slight chance of impacts due to the low likelihood of it occurring.

### G-8.1.2 South Hilight Field

Under the Proposed Action for the South Hilight Field LBA Tract, up to 1,126.0 acres would be disturbed by surface coal mining operations over a period of 1.6 years. Under Alternative 2, BLM's Preferred Alternative, for the South Hilight Field LBA Tract, up to 2,731.4 acres would be disturbed by surface coal mining operations over a period of 2.3 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined.

Direct effects of mining would be the removal of any potentially suitable habitat areas that are located within the mine's disturbance limits. Indirect effects of mining would be associated primarily with hydrological changes resulting from the alteration of natural stream flows and dynamics that could affect other nearby favorable orchid habitat conditions and/or unknown populations. If

there are any unknown occurrences within and near the general Wright analysis area that would not be directly impacted by surface disturbance, dust from mining activities could affect those plants by reducing their vigor and reproduction capability. General habitat fragmentation would occur, which may result in effects to pollinators and disruption of seed dispersal.

Livestock grazing is currently the primary land use, while oil and gas production and recreation are secondary land uses. As such, roughly 7.5 percent of the LBA tract's general analysis area is presently disturbed by roads, areas surrounding active construction sites, ranching-related facilities, oil and gas well sites, and oil and gas production-related facilities. Several reservoirs recently constructed for containment of CBNG discharge water are also present.

No Ute ladies'-tresses have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. It is unlikely that orchid populations would remain undetected during multiple surveys over multiple consecutive years, if they are present in the area. Nonetheless, if undetected populations are present on the potentially suitable habitat in the general analysis area, they would be lost due to surface disturbing activities.

Given the presence of potentially suitable habitat within the tract's general analysis area, there is a slight chance of impacts due to the low likelihood of it occurring.

### G-8.1.3 West Hilight Field

Under the Proposed Action for the West Hilight Field LBA Tract, up to 6,351.4 acres would be disturbed by surface coal mining operations over a period of 2.8 years. Under Alternatives 2 and 3 (Alternative 2 is BLM's Preferred Alternative) for the West Hilight Field LBA Tract, up to 10,250.8 acres would be disturbed by surface coal mining operations over a period of 7.1 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined.

Direct effects of mining would be the removal of any potentially suitable habitat areas that are located within the mine's disturbance limits. Indirect effects of mining would be associated primarily with hydrological changes resulting from the alteration of natural stream flows and dynamics that could affect other nearby favorable orchid habitat conditions and/or unknown populations. If there are any unknown occurrences within and near the general Wright analysis area that would not be directly impacted by surface disturbance, dust from mining activities could affect those plants by reducing their vigor and reproduction capability. General habitat fragmentation would occur, which may result in effects to pollinators and disruption of seed dispersal.

Livestock grazing is currently the primary land use, while oil and gas production and recreation are secondary land uses. As such, roughly 2.0

percent of the LBA tract's general analysis area is presently disturbed by roads, areas surrounding active construction sites, ranching-related facilities, oil and gas well sites, and oil and gas production-related facilities. Several reservoirs recently constructed for containment of CBNG discharge water are also present.

No Ute ladies'-tresses have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. It is unlikely that orchid populations would remain undetected during multiple surveys over multiple consecutive years, if they are present in the area. Nonetheless, if undetected populations are present on the potentially suitable habitat in the general analysis area, they would be lost due to surface disturbing activities.

Given the presence of potentially suitable habitat within the tract's general analysis area, there is a slight chance of impacts due to the low likelihood of it occurring.

### G-8.1.4 West Jacobs Ranch

Under the Proposed Action for the West Jacobs Ranch LBA Tract, up to 7,023.0 acres would be disturbed by surface coal mining operations over a period of 16.7 years. Under Alternative 2, BLM's Preferred Alternative, for the West Jacobs Ranch LBA Tract, up to 9,370.0 acres would be disturbed by surface coal mining operations over a period of 22.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined.

Direct effects of mining would be the removal of any potentially suitable habitat areas that are located within the mine's disturbance limits. Indirect effects of mining would be associated primarily with hydrological changes resulting from the alteration of natural stream flows and dynamics that could affect other nearby favorable orchid habitat conditions and/or unknown populations. If there are any unknown occurrences within and near the general Wright analysis area that would not be directly impacted by surface disturbance, dust from mining activities could affect those plants by reducing their vigor and reproduction capability. General habitat fragmentation would occur, which may result in effects to pollinators and disruption of seed dispersal.

Livestock grazing is currently the primary land use, while oil and gas production and recreation are secondary land uses. As such, roughly 1.6 percent of the LBA tract's general analysis area is presently disturbed by roads, areas surrounding active construction sites, ranching-related facilities, oil and gas well sites, and oil and gas production-related facilities. Several reservoirs recently constructed for containment of CBNG discharge water are also present.

No Ute ladies'-tresses have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. It is unlikely that

orchid populations would remain undetected during multiple surveys over multiple consecutive years, if they are present in the area. Nonetheless, if undetected populations are present on the potentially suitable habitat in the general analysis area, they would be lost due to surface disturbing activities.

Given the presence of potentially suitable habitat within the tract's general analysis area, there is a slight chance of impacts due to the low likelihood of it occurring.

### G-8.1.5 North Porcupine

Under the Proposed Action for the North Porcupine LBA Tract, up to 9,864.0 acres would be disturbed by surface coal mining operations over a period of 6.3 years. Under Alternative 2, BLM's Preferred Alternative, for the North Porcupine LBA Tract, up to 11,444.0 acres would be disturbed by surface coal mining operations over a period of 7.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined.

Direct effects of mining would be the removal of any potentially suitable habitat areas that are located within the mine's disturbance limits. Indirect effects of mining would be associated primarily with hydrological changes resulting from the alteration of natural stream flows and dynamics that could affect other nearby favorable orchid habitat conditions and/or unknown populations. If there are any unknown occurrences within and near the general Wright analysis area that would not be directly impacted by surface disturbance, dust from mining activities could affect those plants by reducing their vigor and reproduction capability. General habitat fragmentation would occur, which may result in effects to pollinators and disruption of seed dispersal.

Livestock grazing is currently the primary land use, while oil and gas production and recreation are secondary land uses. As such, roughly 0.8 percent of the LBA tract's general analysis area is presently disturbed by roads, areas surrounding active construction sites, ranching-related facilities, oil and gas well sites, and oil and gas production-related facilities. Several reservoirs recently constructed for containment of CBNG discharge water are also present.

No Ute ladies'-tresses have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. It is unlikely that orchid populations would remain undetected during multiple surveys over multiple consecutive years, if they are present in the area. Potentially suitable habitat for the species within the tract's general analysis area is present only along portions of Porcupine Creek, which would be directly disturbed by mining. If undetected populations are present on the potentially suitable habitat in the general analysis area, they would be lost due to surface disturbing activities.

Given the presence of potentially suitable habitat within the tract's general analysis area, there is a slight chance of impacts due to the low likelihood of it occurring.

### G-8.1.6 South Porcupine

Under the Proposed Action for the South Porcupine LBA Tract, up to 3,366.0 acres would be disturbed by surface coal mining operations over a period of 3.3 years. Under Alternative 2, BLM's Preferred Alternative, for the South Porcupine LBA Tract, up to 4,068.0 acres would be disturbed by surface coal mining operations over a period of 3.6 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined.

Direct effects of mining would be the removal of any potentially suitable habitat areas that are located within the mine's disturbance limits. Indirect effects of mining would be associated primarily with hydrological changes resulting from the alteration of natural stream flows and dynamics that could affect other nearby favorable orchid habitat conditions and/or unknown populations. If there are any unknown occurrences within and near the general Wright analysis area that would not be directly impacted by surface disturbance, dust from mining activities could affect those plants by reducing their vigor and reproduction capability. General habitat fragmentation would occur, which may result in effects to pollinators and disruption of seed dispersal.

Livestock grazing is currently the primary land use, while oil and gas production and recreation are secondary land uses. As such, roughly 0.6 percent of the LBA tract's general analysis area is presently disturbed by roads, areas surrounding active construction sites, ranching-related facilities, oil and gas well sites, and oil and gas production-related facilities. Several reservoirs recently constructed for containment of CBNG discharge water are also present.

No Ute ladies'-tresses have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. It is unlikely that orchid populations would remain undetected during multiple surveys over multiple consecutive years, if they are present in the area. Nonetheless, if undetected populations are present on the potentially suitable habitat in the general analysis area, they would be lost due to surface disturbing activities.

There is limited potential habitat for this species on the tract, and it occurs only along portions of Mike's Draw, an ephemeral tributary of Porcupine Creek. If the South Porcupine tract is leased by BTU and proposed for mining, the North Antelope Rochelle Mine does not presently intend to mine through Mike's Draw and the areas of potential habitat would therefore not be disturbed under the Proposed Action or Alternative 2. Outside of the narrow strip of riparian habitat located along this drainage, potential habitat throughout the balance of

the LBA tract's general analysis area is rare or non-existent so there is a very low likelihood of any impacts to potentially suitable habitat.

### G-8.2 Black-footed Ferret

Potentially suitable habitat for this species is limited in the general Wright analysis area. Based on more than 30 years of prairie dog colony surveys and numerous surveys specifically for black-footed ferrets conducted according to USFWS guidelines (USFWS 1989), this species has never been documented to occur in this area and the likelihood of them occurring is extremely low.

#### G-8.2.1 North Hilight Field

Under the Proposed Action for the North Hilight Field LBA Tract, up to 5,053.0 acres would be disturbed by surface coal mining operations over a period of 2.0 years. Under Alternative 2, BLM's Preferred Alternative, for the North Hilight Field LBA Tract, up to 12,908.8 acres would be disturbed by surface coal mining operations over a period of 4.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

Two separate black-tailed prairie dog colonies of 3.4 and 19.5 acres in size, which were within the tract's general analysis area and occupied in 2007, would be directly affected by mining activities. Two other separate black-tailed prairie dog colonies of 3.7 and 27.2 acres in size, which were within the surrounding 2-mile survey area and occupied in 2007, would likely be indirectly affected by mining activities.

Based on more than 30 years of historic and recent survey efforts and other general analysis area data and information, it is unlikely that ferrets exist in the North Hilight Field tract general analysis area or surrounding wildlife survey area. Given the documented absence of black-footed ferrets in the region, including the North Hilight Field LBA Tract, the lack of sizeable, contiguous prairie dog colonies within the LBA tract and surrounding areas, the block clearance issued by USFWS for black-tailed prairie dog colonies throughout the entire state, and the distance of the LBA area from future reintroduction sites, mining the general analysis area for the North Hilight Field LBA Tract would not result in any direct or indirect effects on black-footed ferrets.

#### G-8.2.2 South Hilight Field

Under the Proposed Action for the South Hilight Field LBA Tract, up to 1,126.0 acres would be disturbed by surface coal mining operations over a period of 1.6 years. Under Alternative 2, BLM's Preferred Alternative, for the South Hilight

Field LBA Tract, up to 2,731.4 acres would be disturbed by surface coal mining operations over a period of 2.3 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

Just one black-tailed prairie dog colony of less than 1.0 acre in size, which was within the tract's general analysis area and occupied in 2007, would be directly affected by mining activities. Six other separate black-tailed prairie dog colonies of approximately 2.0 to 89.1 acres in size, which were within the surrounding 2-mile survey area and occupied in 2007, would likely be indirectly affected by mining activities.

Based on more than 30 years of historic and recent survey efforts and other general analysis area data and information, it is unlikely that ferrets exist in the South Hilight Field tract's general analysis area or surrounding wildlife survey area. Given the documented absence of black-footed ferrets in the region, including the South Hilight Field LBA Tract, the lack of sizeable, contiguous prairie dog colonies within the LBA tract and surrounding areas, the block clearance issued by USFWS for black-tailed prairie dog colonies throughout the entire state, and the distance of the LBA area from future reintroduction sites, mining the general analysis area for the South Hilight Field LBA Tract would not result in any direct or indirect effects on black-footed ferrets.

### G-8.2.3 West Hilight Field

Under the Proposed Action for the West Hilight Field LBA Tract, up to 6,351.4 acres would be disturbed by surface coal mining operations over a period of 2.8 years. Under Alternatives 2 and 3 (Alternative 2 is BLM's Preferred Alternative) for the West Hilight Field LBA Tract, up to 10,250.8 acres would be disturbed by surface coal mining operations over a period of 7.1 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

Just one black-tailed prairie dog colony of approximately 89.1 acres in size, which was within the tract's general analysis area and occupied in 2007, would be directly affected by mining activities. Seven other separate black-tailed prairie dog colonies of approximately 0.1 to 27.2 acres in size, which were within the surrounding 2-mile survey area and occupied in 2007, would likely be indirectly affected by mining activities.

Based on more than 30 years of historic and recent survey efforts and other general analysis area data and information, it is unlikely that ferrets exist in the West Hilight Field tract general analysis area or surrounding wildlife survey area. Given the documented absence of black-footed ferrets in the region, including the West Hilight Field LBA Tract, the lack of sizeable, contiguous prairie dog colonies within the LBA tract and surrounding areas, the block clearance issued by USFWS for black-tailed prairie dog colonies throughout the entire state, and the distance of the LBA area from future reintroduction sites, mining the general analysis area for the West Hilight Field LBA Tract would have no effect on black-footed ferrets.

### G-8.2.4 West Jacobs Ranch

Under the Proposed Action for the West Jacobs Ranch LBA Tract, up to 7,023.0 acres would be disturbed by surface coal mining operations over a period of 16.7 years. Under Alternative 2, BLM's Preferred Alternative, for the West Jacobs Ranch LBA Tract, up to 9,370.0 acres would be disturbed by surface coal mining operations over a period of 22.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

Just one black-tailed prairie dog colony of approximately 17.9 acres in size, which was within the tract's general analysis area and occupied in 2007, would be directly affected by mining activities. Five other separate black-tailed prairie dog colonies of approximately 2.6 to 27.2 acres in size, which were within the surrounding 2-mile survey area and occupied in 2007, would likely be indirectly affected by mining activities.

Based on more than 30 years of historic and recent survey efforts and other general analysis area data and information, it is unlikely that ferrets exist in the West Jacobs Ranch tract general analysis area or surrounding wildlife survey area. Given the documented absence of black-footed ferrets in the region, including the West Jacobs Ranch LBA Tract, the lack of sizeable, contiguous prairie dog colonies within the LBA tract and surrounding areas, the block clearance issued by USFWS for black-tailed prairie dog colonies throughout the entire state, and the distance of the LBA area from future reintroduction sites, mining the general analysis area for the West Jacobs Ranch LBA Tract would not effect the black-footed ferret.

### G-8.2.5 North Porcupine

Under the Proposed Action for the North Porcupine LBA Tract, up to 9,864.0 acres would be disturbed by surface coal mining operations over a period of 6.3 years. Under Alternative 2, BLM's Preferred Alternative, for the North Porcupine LBA Tract, up to 11,444.0 acres would be disturbed by surface coal

mining operations over a period of 7.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

Just one black-tailed prairie dog colony of approximately 18.6 acres in size, which was within the tract's general analysis area and occupied in 2007, would be directly affected by mining activities. Sixteen other separate black-tailed prairie dog colonies of approximately 1.5 to 345.3 acres in size, which were within the surrounding 2-mile survey area and occupied in 2007, would likely be indirectly affected by mining activities.

Based on more than 30 years of historic and recent survey efforts and other general analysis area data and information, it is unlikely that ferrets exist in the North Porcupine tract general analysis area or surrounding wildlife survey area. Given the documented absence of black-footed ferrets in the region, including the North Porcupine LBA Tract, the lack of sizeable, contiguous prairie dog colonies within the LBA tract and surrounding areas, the block clearance issued by USFWS for black-tailed prairie dog colonies throughout the entire state, and the distance of the LBA area from future reintroduction sites, mining the general analysis area for the North Porcupine LBA Tract would not result in any direct or indirect effects on black-footed ferrets.

### G-8.2.6 South Porcupine

Under the Proposed Action for the South Porcupine LBA Tract, up to 3,366.0 acres would be disturbed by surface coal mining operations over a period of 3.3 years. Under Alternative 2, BLM's Preferred Alternative, for the South Porcupine LBA Tract, up to 4,068.0 acres would be disturbed by surface coal mining operations over a period of 3.6 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

There were no occupied black-tailed prairie dog colonies within the tract's general analysis area in 2007; therefore, no colonies would be directly affected by mining activities. Ten other separate black-tailed prairie dog colonies of approximately 1.0 to 345.3 acres in size, which were within the surrounding 2-mile survey area and occupied in 2007, would likely be indirectly affected by mining activities.

Based on more than 30 years of historic and recent survey efforts and other general analysis area data and information, it is unlikely that ferrets exist in the South Porcupine tract general analysis area or surrounding wildlife survey

area. Given the documented absence of black-footed ferrets in the region, including the South Porcupine LBA Tract, the lack of sizeable, contiguous prairie dog colonies within the LBA tract and surrounding areas, the block clearance issued by USFWS for black-tailed prairie dog colonies throughout the entire state, and the distance of the LBA area from future reintroduction sites, mining the general analysis area for the South Porcupine LBA Tract would not result in any direct or indirect effects on black-footed ferrets.

### G-8.3 Blowout Penstemon

In Wyoming, blowout penstemon is only known to occur in certain habitats south of the Ferris Mountains in the northern part of Carbon County. The suitable habitat evaluations for each of the WAC LBA tracts (section G-7.3.2) did not identify any areas of potentially suitable habitat for blowout penstemon. This species has never been documented to occur in this area and the likelihood of the plant occurring is extremely low.

#### G-8.3.1 North Hilight Field

Under the Proposed Action for the North Hilight Field LBA Tract, up to 5,053.0 acres would be disturbed by surface coal mining operations over a period of 2.0 years. Under Alternative 2, BLM's Preferred Alternative, for the North Hilight Field LBA Tract, up to 12,908.8 acres would be disturbed by surface coal mining operations over a period of 4.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

No blowout penstemon have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. Given the lack of any potentially suitable habitat within the LBA tract and surrounding areas and the documented absence of the species in the region, mining the general analysis area for the North Hilight Field LBA Tract would not result in any direct or indirect effects on blowout penstemon.

#### G-8.3.2 South Hilight Field

Under the Proposed Action for the South Hilight Field LBA Tract, up to 1,126.0 acres would be disturbed by surface coal mining operations over a period of 1.6 years. Under Alternative 2, BLM's Preferred Alternative, for the South Hilight Field LBA Tract, up to 2,731.4 acres would be disturbed by surface coal mining operations over a period of 2.3 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of

heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

No blowout penstemon have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. Given the lack of any potentially suitable habitat within the LBA tract and surrounding areas and the documented absence of the species in the region, mining the general analysis area for the South Hilight Field LBA Tract would not result in any direct or indirect effects on blowout penstemon.

### G-8.3.3 West Hilight Field

Under the Proposed Action for the West Hilight Field LBA Tract, up to 6,351.4 acres would be disturbed by surface coal mining operations over a period of 2.8 years. Under Alternatives 2 and 3 (Alternative 2 is BLM's Preferred Alternative) for the West Hilight Field LBA Tract, up to 10,250.8 acres would be disturbed by surface coal mining operations over a period of 7.1 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

No blowout penstemon have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. Given the lack of any potentially suitable habitat within the LBA tract and surrounding areas and the documented absence of the species in the region, mining the general analysis area for the West Hilight Field LBA Tract would not result in any direct or indirect effects on blowout penstemon.

### G-8.3.4 West Jacobs Ranch

Under the Proposed Action for the West Jacobs Ranch LBA Tract, up to 7,023.0 acres would be disturbed by surface coal mining operations over a period of 16.7 years. Under Alternative 2, BLM's Preferred Alternative, for the West Jacobs Ranch LBA Tract, up to 9,370.0 acres would be disturbed by surface coal mining operations over a period of 22.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

No blowout penstemon have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. Given the lack of any potentially suitable habitat within the LBA tract and surrounding areas and the documented absence of the species in the region, mining the general

analysis area for the West Jacobs Ranch LBA Tract would not result in any direct or indirect effects on blowout penstemon.

### G-8.3.5 North Porcupine

Under the Proposed Action for the North Porcupine LBA Tract, up to 9,864.0 acres would be disturbed by surface coal mining operations over a period of 6.3 years. Under Alternative 2, BLM's Preferred Alternative, for the North Porcupine LBA Tract, up to 11,444.0 acres would be disturbed by surface coal mining operations over a period of 7.8 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

No blowout penstemon have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. Given the lack of any potentially suitable habitat within the LBA tract and surrounding areas and the documented absence of the species in the region, mining the general analysis area for the North Porcupine LBA Tract would not result in any direct or indirect effects on blowout penstemon.

### G-8.3.6 South Porcupine

Under the Proposed Action for the South Porcupine LBA Tract, up to 3,366.0 acres would be disturbed by surface coal mining operations over a period of 3.3 years. Under Alternative 2, BLM's Preferred Alternative, for the South Porcupine LBA Tract, up to 4,068.0 acres would be disturbed by surface coal mining operations over a period of 3.6 years. Although the total disturbance acreage is known, the distribution of this disturbance will not be known until site-specific mine and reclamation plans have been determined. Mine activities include, but are not limited to, large-scale topsoil stripping, the intense presence of heavy machinery, extended human presence, loud noise and various linear disturbances such as roads, power lines and fences.

No blowout penstemon have been recorded within the LBA tract's general analysis area or the adjacent mine permit areas to date. Given the lack of any potentially suitable habitat within the LBA tract and surrounding areas and the documented absence of the species in the region, mining the general analysis area for the South Porcupine LBA Tract would not result in any direct or indirect effects on blowout penstemon.

## G-9.0 CUMULATIVE IMPACTS

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.2). A

cumulative impact analysis is used to evaluate the influences of past, present, and reasonably foreseeable future human developments, and examines impacts on a broader scale.

The BLM recently completed a regional technical study, called the PRB Coal Review, to help evaluate the cumulative impacts of coal and other mineral development in the PRB. The PRB Coal Review consists of three tasks:

- Task 1 identifies existing resource conditions in the PRB for the baseline year (2003) and, for applicable resources, updates the BLM's 1996 status check for coal development in the PRB.
- Task 2 defines the past and present development activities in the PRB and their associated development levels as of 2003 and develops a forecast of reasonably foreseeable development in the PRB through 2020. The reasonably foreseeable activities fall into three broad categories: coal development (coal mine and coal-related), oil and gas development (conventional oil and gas, coal bed natural gas, and major transportation pipelines), and other development, which includes development that is not energy-related as well as other energy-related development.
- Task 3 predicts the cumulative impacts that could be expected to occur to air, water, socioeconomic, and other resources if the development occurs as projected in the forecast developed under Task 2.

A series of reports have been prepared to present the results of the PRB Coal Review task studies. The Task 1, 2, and 3 reports represent components of a technical study of cumulative development in the PRB; they do not evaluate specific proposed projects, but they provide information that BLM is using to evaluate the cumulative impacts that would be expected to occur if specific projects or applications, such as the six LBA tracts in the general Wright analysis area, are approved. These reports are available for viewing at the BLM offices in Casper and Cheyenne and on the Wyoming BLM website at http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html. Chapter 4 of this EIS summarizes the information presented in the PRB Coal Review task studies and Table 4-10 in that section summarizes the total actual disturbance and reclamation acreages for 2003 (the baseline year) and 2007 and the total projected disturbance and reclamation acreages for 2010, 2015, and 2020.

For the majority of the resources considered in the PRB Coal Review, the Task 3 study area is based on watershed boundaries in the PRB and includes the portions of the Upper Powder River, Little Powder River, Upper Belle Fourche River, Upper Cheyenne River, Antelope Creek, and Dry Fork Cheyenne River subwatersheds that lie within Sheridan, Johnson, Campbell and northern Converse counties. The six WAC LBA tracts are included within the Upper Cheyenne River and Antelope Creek subwatersheds, which are depicted on Figure 4-4 in Chapter 4 of this EIS. The total Task 3 cumulative effects study

area includes over 4 million acres. A total of approximately 210,096 acres of this land area had been disturbed by development activities (e.g., ranching-related, coal mining-related, and oil and gas-related) as of 2003, which represents about 5.2 percent of the total Task 3 study area. As of the end of 2007, a total of approximately 222,568 acres (about 5.6 percent) of land area had been disturbed by development activities in the cumulative effects study area. Of the 222,568 acres of total habitat disturbance, approximately 113,382 acres (51 percent) have been reclaimed. The remaining 132,645 acres of habitat would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 83,593 total cumulative acres of habitat disturbance directly associated with coal mine development, approximately 25,884 acres (31 percent) have been reclaimed (as of 2007). Of the remaining 57,709 acres of disturbance, approximately 24,338 acres currently are not available for reclamation, as they are occupied by long-term facilities (i.e., roads, buildings coal handling facilities) that are needed to conduct mining operations. These areas would be reclaimed near the end of mine life. Reclamation of the remaining 33,371 acres, which represent areas of active mining and areas where coal has been recovered but reclamation has not been completed, would proceed concurrently with coal mining.

According to the PRB Coal Review, the 2007 total of 222,568 acres of cumulative disturbance is projected to increase to as much as 434,374 acres by 2020 under the upper coal production scenario, which would represent approximately 10.9 percent of the cumulative study area. Of that total, approximately 296,670 acres (68 percent) would be reclaimed by 2020. The remaining 137,702 acres of habitat disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 149,089 acres (34 percent of the total cumulative disturbance) that are projected to be associated with coal mine development, it is projected that approximately 86,196 acres (58 percent) would be reclaimed by 2020.

BLM estimates that the existing federal coal leases in the Wyoming PRB include approximately 125,180 acres. The currently pending federal coal LBA tracts (including the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts) include approximately 34,571.75 additional acres. The majority of the coal in the areas permitted for surface coal mining is federal, but some state and private leases are included within some of the existing mine permit areas. All of the current and proposed federal coal leases are concentrated near the outcrop of the Wyodak coal bed, which is located in eastern Campbell County and the extreme northeastern edge of Converse County.

Oil and gas exploration and production have been ongoing in the PRB for more than 100 years. Conventional (non-CBNG) oil and gas fields are, for the most part, concentrated in the central and southern parts of the structural basin. Development of the CBNG resources from the coal beds is a more recent

occurrence, with CBNG production in the Wyoming PRB starting in the late 1980s. As of 2003, an estimated 177,140 acres had been disturbed in the coal review project area as a result of oil and gas development activities, but approximately 114,777 acres of that disturbance has been reclaimed. This includes conventional oil and gas and CBNG wells and associated facilities and major transportation pipelines.

The existing habitat disturbing activities within the general Wright analysis area, aside from coal mining, are conventional oil and gas and CBNG development, agricultural (ranching) activities, recreational activities, roads, and railroads. Mining developments tend to have more intense impacts on fairly localized areas, while ranching (livestock grazing) activities, recreational activities, and oil and gas development can be less intensive locally but tend to spread over larger areas. Mining activities and oil and gas development have requirements for reclamation of disturbed areas as resources are depleted. The net area of energy disturbance in the general Wright analysis area has been increasing. This means that in the short term, the potential direct impacts to T&E species is a reduction in the available habitat. In the long term, habitat is being and will continue to be restored as reclamation proceeds. Indirect threats to T&E species would include the potential import and spread of noxious weeds, which have the ability to displace native vegetation and hinder reclamation efforts. Control of noxious weeds is addressed in surface coal mining and oil and gas reclamation plans. Provided weed mitigation and preventative procedures are applied to all construction and reclamation practices, impact of noxious weeds on T&E species would be minimized. Indirect loss of habitat due to habitat fragmentation is also a potential adverse effect to federally protected species.

The existing mines have developed mitigation procedures, as required by SMCRA (at 30 CFR 816.97) and Wyoming state regulations, to protect T&E species. These procedural requirements would be extended to include mining operations on the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts, if they are leased as proposed, and after required detailed plans to mine the coal and reclaim the mined-out areas are developed and approved. Species-specific cumulative impacts are discussed below.

### G-9.1 Ute Ladies'-tresses

Potential direct impacts to this plant species as a result of development activities in the PRB Coal Review Task 3 study area could include incremental loss or alteration of potentially suitable habitat, associated with past and projected activities. Indirect impacts could occur due to the increased dispersal and establishment of noxious weeds, which may result in the displacement of the species in the long term.

Operations associated with development activities in the Task 3 study area would result in the use of groundwater. Annually, during 2010-2020, from

30,000-35,000 million gallons per year of CBNG-produced water would be discharged to impoundments or intermittent and ephemeral streams or re-injected. The surface discharge of large quantities of produced water could alter stream morphology and hydrology and result in the creation of wetlands in containment ponds, landscape depressions, and riparian areas along drainages that previously supported upland vegetation. Existing wetlands and riparian areas that would receive additional water would become more extensive and potentially support a greater diversity of wetland species in the long term. Once water discharges have peaked and subsequently decrease in the long term, the extent of wetlands and riparian areas and species diversity would decrease accordingly. After the complete cessation of water discharges, artificially-created wetland and riparian areas once again would support upland species and previously existing wetland and riparian areas would decrease in areal extent.

Implementation of the Proposed Action and Alternative 2, BLM's Preferred Alternative, for each of the six WAC LBA tracts is not expected to contribute to cumulative impacts upon Ute ladies'-tresses due to a lack of confirmed occurrences of the species within the general Wright analysis area. Should future surveys identify populations of Ute ladies'-tresses, such populations and associated habitats would be avoided.

### G-9.2 Black-footed Ferret

Implementation of Alternative 2, BLM's Preferred Alternative, for each of the six WAC LBA tracts would directly affect a total of six prairie dog colonies by surface disturbance (topsoil salvage operations) and 27 would be indirectly affected by increased activity (noise levels and human presence) in the immediate area, resulting in the overall reduction in prairie dog habitat suitability. Additionally, ongoing disturbances from sources unrelated to mining (ranching and oil and gas production activities) would likely continue, with some activities occurring within prairie dog colonies in the area. These activities would result in less habitat disturbance than surface mining, but physical disturbance would occur.

Intensive coal mining and natural gas development have occurred in the general Wright analysis area for more than 30 years, with activities expected to increase in the immediate future. Leasing and mining lands in the six WAC LBA tracts' general analysis areas is not expected to contribute to cumulative impacts upon black-footed ferrets within either the general Wright analysis area or this region of Wyoming. No black-footed ferret populations exist within northeastern Wyoming or the TBNG. The USFWS issued a block clearance for this species in black-tailed prairie dog colonies throughout Wyoming. The focus area for ferret reintroduction efforts is outside the coal mine region of the PRB of northeast Wyoming (USFS 2002b, Grenier 2003). Furthermore, the Proposed Action and Alternatives 1 and 2 for any or all six of the WAC LBA tracts would not conflict with any future objectives to manage the area for, or reintroduce black-footed ferrets into, the TBNG.

### G-9.3 Blowout Penstemon

Implementation of the Proposed Action and Alternative 2, BLM's Preferred Alternative, for each of the six WAC LBA tracts is not expected to contribute to cumulative impacts upon blowout penstemon due to the absence of suitable habitat and a lack of confirmed occurrences of the species within the general Wright analysis area.

## G-10.0 THREATS AND CONSERVATION MEASURES TO AVOID OR REDUCE ADVERSE IMPACTS

### G-10.1 Ute Ladies'-tresses

Rangewide, current and potential threats to the species include: urbanization, road and infrastructure construction, hydrologic development, agricultural conversion of wetlands, non-native plant invasion, pesticide application, pollinator loss, over collection, livestock and native herbivore grazing, recreation, drought, vegetation succession, fire suppression, and intrinsic rarity of Ute ladies'-tresses and associated mycorrhizal fungi (USFWS 1992b, Fertig et al. 2005). Threats observed locally upon potentially suitable habitat for the species are primarily hydrological changes resulting from the alteration of the surface water flows by CBNG development and coal mining activities. Other threats may be off-road vehicle use, invasion by non-native and/or noxious plants, control of weeds with herbicides, and overgrazing.

LBA tracts that are offered for lease would be subject to lease stipulations that will protect populations of Ute ladies'-tresses, should they be found to occur within the LBA tract. Any potential habitat that has not already been surveyed for Ute ladies'-tresses within the project area shall be identified and surveyed prior to surface mining activities. If this species is found within an LBA tract that is offered for lease, either a no-surface-disturbance buffer could be placed around the population to prevent any potential impacts, the plants could be salvaged for study to contribute to the science on the species, or the plants could be transplanted to another suitable habitat outside of the disturbance area.

Jurisdictional wetlands located in the six WAC LBA tracts that are destroyed by mining operations would be replaced in accordance with the requirements of Section 404 of the Clean Water Act (CWA), as determined by the COE. The replaced wetlands may not duplicate the exact function and landscape features of the pre-mine wetlands. COE considers the type and function of each jurisdictional wetland that will be impacted and may require restoration of additional acres if the type and function of the restored wetlands will not completely replace the type and function of the original wetland. Replacement of non-jurisdictional and functional wetlands may be required by the surface land owner and/or WDEQ/LQD. WDEQ/LQD allows, and sometimes requires, mitigation of non-jurisdictional wetlands affected by mining, depending on the

values associated with the wetland features. WDEQ/LQD also requires replacement of playas with hydrologic significance.

All appropriate sedimentation, erosion control, and produced water control measures will be implemented to avoid changes in surface water quality or quantity in the area.

The approved Black Thunder Mine Permit 233-T7 (TBCC 2005), Jacobs Ranch Mine Permit 271-T6 (JRCC 2009), and North Antelope Rochelle Mine Permit 569-T7 (PRC 2009) include monitoring and mitigation measures that are required by and Wyoming state law. If one or more of the WAC LBA tracts are acquired by ALC and/or BTU, these required measures would be extended to cover operations on the LBA tract(s) when the respective mining permit is amended to include the tract. This amended permit would have to be approved before mining operations could take place on the tract. Continued site-specific surveys for the lease area and appropriate perimeter would be part of the mine permitting process if a tract is leased and proposed for mining. All of these monitoring, mitigation and conservation measures are considered to be part of the Proposed Action and alternatives during the leasing process because they are regulatory requirements.

According to the USFWS 2005 Rangewide Status Review of Ute Ladies'-tresses (Fertig et al. 2005), the number of populations, geographic ranges, acreages, and estimated population sizes of this species has increased significantly since it was listed in 1992. Much of this can be attributed to increased survey and project analysis work over much of the western United States and heightened awareness of the plant due to its protected status. When the orchid was listed as threatened in 1992, it had an estimated population size of 6,000 individuals. In 2005, additional survey work estimated the number of plants to be over 83,300. USFWS determined that a petition to remove the orchid from federal protection under the ESA provided substantial biological information, which indicated that removal may be warranted. As of December 2005, the Service was moving forward with the proposal to delist the Ute ladies'-tresses, but a final decision has not yet been made. A 5-year study is needed before such action could occur.

### G-10.2 Black-footed Ferret

Loss of habitat is the primary reason black-footed ferrets remain near the brink of extinction. Major threats contributing to the slow decline in black-tailed prairie dog populations and reduced ferret habitat include conversion of native grasslands to intensive agricultural uses, urbanization, widespread prairie dog eradication programs (including recreational shooting), and fatal non-native disease (sylvatic plague) (BFFRIT 2009). Mineral development within black-tailed prairie dog colonies is a leading cause of potential ferret habitat loss in the PRB. Surface coal mining tends to have more intense impacts on fairly localized areas, while oil and gas development tends to be less intensive but spread over larger areas. Oil and gas development and mining activities have

requirements for reclamation of disturbed areas as resources are depleted. In reclaimed areas, vegetation cover may differ from undisturbed areas. In the case of surface coal mines, re-established vegetation would be dominated by species mandated in the reclamation seed mixtures (to be approved by WDEQ). The majority of the approved plant species are native to the area; however, reclaimed areas may not serve ecosystem functions presently served by undisturbed vegetation communities and habitats, particularly in the short-term, when species composition, shrub cover, and other environmental factors are likely to be different. Shifts in habitat composition or distribution following reclamation could increase or decrease potential habitat for prairie dogs and associated habitat for black-footed ferrets. However, black-tailed prairie dogs have been recorded in colonies on reclaimed coal mined lands in northeastern Wyoming in recent years, whether by natural expansion or purposeful relocations (J&S 2008, IR 2007).

The approved Black Thunder Mine Permit 233-T7 (TBCC 2005), Jacobs Ranch Mine Permit 271-T6 (JRCC 2009), and North Antelope Rochelle Mine Permit 569-T7 (PRC 2009) include monitoring and mitigation measures that are required by and Wyoming state law. If one or more of the WAC LBA tracts are acquired by ALC and/or BTU, these required measures would be extended to cover operations on the LBA tract(s) when the respective mining permit is amended to include the tract. This amended permit would have to be approved before mining operations could take place on the tract. Continued site-specific surveys for the lease area and appropriate perimeter would be part of the mine permitting process if a tract is leased and proposed for mining. These monitoring and mitigation measures are considered to be part of the Proposed Action and alternatives during the leasing process because they are regulatory requirements.

### G-10.3 Blowout Penstemon

No one reason has been determined for the blowout penstemon decline from being a relatively common plant in the early 1900s to an endangered plant at present. Blowout penstemon is adapted to a dynamic habitat that moves continually, but is an early successional species. The blowout community contains plants especially tolerant of disturbance caused by wind erosion as blowout sand is excavated and wind-driven. Wind erosion is important in maintaining the open habitat required by blowout penstemon. If other plants invade the open habitat, the blowout penstemon declines. Improved range management practices and active fire suppression programs have led to increases in prairie vegetation cover with decreases in sandy areas. The greatly reduced surface area of shifting sand dunes and the number of blowouts have been beneficial to the ranching community but has proven detrimental to blowout penstemon (Stubbendieke and Kottas 2007). Blowouts represent a significant loss of forage production, but they provide ideal habitat for plants such as the blowout penstemon (Weedon et al. 1982, Flessner 1988).

The species requires abundant soil moisture for germination and moisture may not be adequate in some years for germination or survival. The primary limiting factor in seedling establishment is moisture availability. For the seeds to germinate and for the roots to reach a depth where moisture is available and constant, blowout sand must remain damp for at least 2 weeks during the growing season. In the arid environment of sandy blowouts, these conditions usually only occur in one out of every 8 to 10 years. The drought of the 1930s is the most conspicuous stressful event and may have contributed to a severe reduction in the species. The low natural seedling survival rates combined with a relatively short life span of about 6 to 8 years explains part of the reason for the small size of the present natural population (Stubbendieke and Kottas 2007).

Most populations are physically isolated in a few sites and the probability of seeds migrating to other blowouts is small. These populations are also genetically isolated so the prospect for introduction of genetic material from one population to another is unlikely. The small geographic range of existing plants is of concern since the possibility of localized droughts could severely impact entire populations (Stubbendieke and Kottas 2007).

This species is potentially vulnerable to habitat loss and degradation resulting from sand mining, water development, energy development, off-road vehicle use, and the spread of non-native species (University of Wyoming 2008).

The Wyoming BLM is developing a blowout penstemon conservation strategy in coordination with local, state, and federal agencies, as well as private land owners, to apply federal statutes and agency policy in a way that addresses the conservation needs of this plant. The goal is to foster long term viability of the blowout penstemon and avert potential threats that include oil, gas, powerline, wind farm, and water development, sand mining, off-road vehicle use, livestock grazing, and plant collection. BLM continues to work with the Wyoming Natural Diversity Database and the Rocky Mountain Herbarium at the University of Wyoming to survey, monitor, and research native plant species in order to maintain Wyoming's native plants and their habitats (Heidel et al. 2007).

According to Heidel et al. (2007), monitoring of Wyoming blowout penstemon populations during dry years (2003-2006) suggests that this plant can survive drought. While this plant's habitat is continually being eroded by wind or buried by shifting sand, new habitat is developing. Additionally, long-lived seeds may provide important buffer from the uncertainties of unstable habitat and unsuitable climatic conditions. Research and monitoring are helping to ensure the long-term viability of blowout penstemon populations in Wyoming (Heidel et al.2007).

Blowout penstemon plants are now being propagated in University of Nebraska greenhouses and successfully transplanted to suitable habitat in the Nebraska Sandhills (USFS 2009).

The approved Black Thunder Mine Permit 233-T7 (TBCC 2005), Jacobs Ranch Mine Permit 271-T6 (JRCC 2009), and North Antelope Rochelle Mine Permit 569-T7 (PRC 2009) include monitoring and mitigation measures that are required by and Wyoming state law. If one or more of the WAC LBA tracts are acquired by ALC and/or BTU, these required measures would be extended to cover operations on the LBA tract(s) when the respective mining permit is amended to include the tract. This amended permit would have to be approved before mining operations could take place on the tract. Continued site-specific surveys for the lease area and appropriate perimeter would be part of the mine permitting process if a tract is leased and proposed for mining. Habitat for the blowout penstemon will be identified prior to any surface disturbing activities. If suitable habitat (e.g., sparsely vegetated active sand dunes or sand dune blowouts) is determined to be present on the site, surveys will be conducted for the presence of this species. If the species is found, a no-surface-disturbance buffer would be placed around the population consistent with the Bureau's Statewide Programmatic Biological Assessment (BLM 2005). These monitoring and mitigation measures are considered to be part of the Proposed Action and alternatives during the leasing process because they are regulatory requirements.

## G-11.0 EFFECTS OF THE PROPOSED ACTIONS AND ALTERNATIVES ON THE EXPECTED STATUS OF SPECIES IN THE FUTURE

Provided the conservation measures described above are implemented, the Proposed Action and Preferred Alternative with respect to each WAC LBA tract is not expected to alter the current status of, or result in any decreased survival of, the Ute ladies'-tresses, the black-footed ferret, and the blowout penstemon during the duration of mining and reclamation of each LBA tract.

## G-12.0 DETERMINATION OF EFFECTS FOR LISTED SPECIES

The following subsections present the conclusions made concerning the direct and indirect effects of the Proposed Actions and alternatives on the Ute ladies'-tresses, the black-footed ferret, and the blowout penstemon, together with the effects of other activities that are interrelated or interdependent with those actions. These effects are considered along with the environmental baseline and predicted cumulative effects to determine the overall effects to the listed species.

### G-12.1 Ute Ladies'-tresses

#### G-12.1.1 North Hilight Field

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the North Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative),

may affect, but is **not likely to adversely affect** Ute ladies'-tresses. It is expected that the effects on the species would be discountable, or extremely unlikely to occur.

The general analysis area for this tract is not located within the same drainage basin as the nearest known population of Ute ladies'-tresses. Previous surveys for Ute ladies'-tresses have been conducted within the adjacent mine permit areas and BAs have been prepared to evaluate the potential effects to the species by leasing federal coal tracts and disturbing federal surface lands located inside the mines' existing permit areas, but no plants were ever found. No Ute ladies'-tresses were found during the 2008 and 2009 surveys of all areas of potentially suitable habitat within the general analysis area for the North Hilight Field tract. The USFWS Interim Survey Requirements for Ute ladies'-tresses recommends all suitable habitat areas be surveyed annually for three consecutive years (USFWS 1992b); therefore, another survey is scheduled to be conducted during the species' flowering period in 2010. Despite the uncertainty, it does not affect this determination because it is extremely unlikely that any orchids will be found in the future within this area.

### G-12.1.2 South Hilight Field

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the South Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), may affect, but is **not likely to adversely affect** Ute ladies'-tresses. It is expected that the effects on the species would be discountable, or extremely unlikely to occur.

The general analysis area for this tract is not located within the same drainage basin as the nearest known population of Ute ladies'-tresses. Previous surveys for Ute ladies'-tresses have been conducted within the adjacent mine permit areas and BAs have been prepared to evaluate the potential effects to the species by leasing federal coal tracts and disturbing federal surface lands located inside the mines' existing permit areas, but no plants were ever found. No Ute ladies'-tresses were found during the 2008 and 2009 surveys of all areas of potentially suitable habitat within the general analysis area for the South Hilight Field tract. The USFWS Interim Survey Requirements for Ute ladies'-tresses recommends all suitable habitat areas be surveyed annually for three consecutive years (USFWS 1992b); therefore, another survey is scheduled to be conducted during the species' flowering period in 2010. Despite the uncertainty, it does not affect this determination because it is extremely unlikely that any orchids will be found in the future within this area.

### G-12.1.3 West Hilight Field

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the West Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), may affect, but is **not likely to adversely affect** Ute ladies'-tresses. It is expected that the effects on the species would be discountable, or extremely unlikely to occur.

The general analysis area for this tract is not located within the same drainage basin as the nearest known population of Ute ladies'-tresses. Previous surveys for Ute ladies'-tresses have been conducted within the adjacent mine permit areas and BAs have been prepared to evaluate the potential effects to the species by leasing federal coal tracts and disturbing federal surface lands located inside the mines' existing permit areas, but no plants were ever found. No Ute ladies'-tresses were found during the 2008 and 2009 surveys of all areas of potentially suitable habitat within the general analysis area for the West Hilight Field tract. The USFWS Interim Survey Requirements for Ute ladies'-tresses recommends all suitable habitat areas be surveyed annually for three consecutive years (USFWS 1992b); therefore, another survey is scheduled to be conducted during the species' flowering period in 2010. Despite the uncertainty, it does not affect this determination because it is extremely unlikely that any orchids will be found in the future within this area.

### G-12.1.4 West Jacobs Ranch

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the West Jacobs Ranch LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), may affect, but is **not likely to adversely affect** Ute ladies'-tresses. It is expected that the effects on the species would be discountable, or extremely unlikely to occur.

The general analysis area for this tract is not located within the same drainage basin as the nearest known population of Ute ladies'-tresses. Previous surveys for Ute ladies'-tresses have been conducted within the adjacent mine permit areas and BAs have been prepared to evaluate the potential effects to the species by leasing federal coal tracts and disturbing federal surface lands located inside the mines' existing permit areas, but no plants were ever found. No Ute ladies'-tresses were found during the 2007, 2008, and 2009 surveys of all areas of potentially suitable habitat within the general analysis area for the West Jacobs Ranch tract. The surface discharge of groundwater associated with CBNG development in the area has caused soil moisture conditions along water courses to change and the distribution of plant communities have

therefore been altered to some degree. Nevertheless, the quality of potential habitat remains poor for a number of key reasons, which are discussed in Section G-7.1.2.4 of this BA. In addition, survey personnel noticed that the surface discharges from CBNG production in 2009 had declined relative to conditions observed in 2007 and 2008. Despite the uncertainty of future surficial hydrologic conditions, it does not affect this determination because it is extremely unlikely that any orchids will be found in the future within this area.

### G-12.1.5 North Porcupine

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the North Porcupine LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), may affect, but is **not likely to adversely affect** Ute ladies'-tresses. It is expected that the effects on the species would be discountable, or extremely unlikely to occur.

Most of the general analysis area for this tract is located within the Antelope Creek drainage basin and the nearest known population of Ute ladies'-tresses is located within the same watershed roughly 28 miles west-southwest of the tract. The LBA tract's entire general analysis area is located within the North Antelope Rochelle Mine's existing mine permit area, and as such, a number of Ute ladies'-tresses surveys covering various portions of the potentially suitable habitat within the tract's general analysis area have been conducted. Surveys for the species have also been conducted and BAs have been prepared to evaluate the potential effects to the species by leasing adjacent federal coal tracts. No occurrence of the orchid has been recorded by any of those previous surveys. Two additional surveys of the potentially suitable habitat within the general analysis area for this tract are scheduled to be conducted during the species' flowering period in 2010 and 2011, in order to fulfill the USFWS Interim Survey Requirements (USFWS 1992b) for Ute ladies'-tresses. Despite the uncertainty, it does not affect this determination because it is extremely unlikely that any orchids will be found in the future within this area.

### G-12.1.6 South Porcupine

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the South Porcupine LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), may affect, but is **not likely to adversely affect** Ute ladies'-tresses. It is expected that the effects on the species would be discountable, or extremely unlikely to occur.

The general analysis area for this tract is located within the Antelope Creek drainage basin and the nearest known population of Ute ladies'-tresses is located within the same watershed roughly 29 miles west of the tract. The LBA tract's entire general analysis area is located within the North Antelope Rochelle Mine's existing mine permit area, and as such, a number of Ute ladies'-tresses surveys covering the potentially suitable habitat within the tract have been conducted. Surveys for the species have also been conducted and BAs have been prepared to evaluate the potential effects to the species by leasing adjacent federal coal tracts. No occurrence of the orchid was been recorded by any of those previous surveys. Two additional surveys of the potentially suitable habitat within the general analysis area for this tract are scheduled to be conducted during the species' flowering period in 2010 and 2011, in order to fulfill the USFWS Interim Survey Requirements (USFWS 1992b) for Ute ladies'-tresses. Despite the uncertainty, it does not affect this determination because it is extremely unlikely that any orchids will be found in the future within this area.

### G-12.2 Black-footed Ferret

#### G-12.2.1 North Hilight Field

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the North Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on black-footed ferrets.

#### G-12.2.2 South Hilight Field

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the South Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on black-footed ferrets.

#### G-12.2.3 West Hilight Field

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the West Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), **would have no affect** on black-footed ferrets.

### G-12.2.4 West Jacobs Ranch

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the West Jacobs Ranch LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on black-footed ferrets.

### G-12.2.5 North Porcupine

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the North Porcupine LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on black-footed ferrets.

### G-12.2.6 South Porcupine

Based upon the impact analyses of the alternatives, the current status of this species, other land use activities in the area, and incorporation of the conservation measures recommended in this BA, it is concluded that mining the federal coal included in the South Porcupine LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on black-footed ferrets.

## G-12.3 Blowout Penstemon

### G-12.3.1 North Hilight Field

Based on the lack of suitable habitat in the tract's general analysis area and the known distribution of this species in the state of Wyoming, it is extremely unlikely that the blowout penstemon would occur in the tract's general analysis area. Therefore, it is concluded that mining the federal coal included in the North Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on blowout penstemon.

### G-12.3.2 South Hilight Field

Based on the lack of suitable habitat in the tract's general analysis area and the known distribution of this species in the state of Wyoming, it is extremely unlikely that the blowout penstemon would occur in the tract's general analysis area. Therefore, it is concluded that mining the federal coal included in the South Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on blowout penstemon.

### G-12.3.3 West Hilight Field

Based on the lack of suitable habitat in the tract's general analysis area and the known distribution of this species in the state of Wyoming, it is extremely unlikely that the blowout penstemon would occur in the tract's general analysis area. Therefore, it is concluded that mining the federal coal included in the West Hilight Field LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on blowout penstemon.

### G-12.3.4 West Jacobs Ranch

Based on the lack of suitable habitat in the tract's general analysis area and the known distribution of this species in the state of Wyoming, it is extremely unlikely that the blowout penstemon would occur in the tract's general analysis area. Therefore, it is concluded that mining the federal coal included in the West Jacobs Ranch LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on blowout penstemon.

### G-12.3.5 North Porcupine

Based on the lack of suitable habitat in the tract's general analysis area and the known distribution of this species in the state of Wyoming, it is extremely unlikely that the blowout penstemon would occur in the tract's general analysis area. Therefore, it is concluded that mining the federal coal included in the North Porcupine LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on blowout penstemon.

### G-12.3.6 South Porcupine

Based on the lack of suitable habitat in the tract's general analysis area and the known distribution of this species in the state of Wyoming, it is extremely unlikely that the blowout penstemon would occur in the tract's general analysis area. Therefore, it is concluded that mining the federal coal included in the South Porcupine LBA Tract, if the tract is leased under the Proposed Action or Alternative 2 (BLM's Preferred Alternative), would have **no affect** on blowout penstemon.

## G-13.0 CREDENTIALS OF SURVEY PERSONNEL

### G-13.1 North, South and West Hilight Field LBA Tracts

#### G-13.1.1 T&E Animal Species

*Consulting Firm: Thunderbird/Jones & Stokes of Gillette, Wyoming*

Gwyn McKee: Ms. McKee obtained a Master of Science degree in Wildlife Ecology/Management from the University of Missouri-Columbia. She has accumulated nearly 20 years of professional experience, with the last 14 spent working with the energy industry in Wyoming, Montana, and South Dakota. Ms. McKee has conducted the wildlife surveys and impact analyses for most of the surface coal mines in the PRB during her tenure in Wyoming, including two of the three applicant mines included this EIS. She has also provided and/or reviewed the pertinent text related to impact assessments for vertebrate species of concern for most of the coal EISs that have been prepared in the PRB since 2000.

Jennifer Ottinger: Ms. Ottinger received a B.S. in Zoology from Colorado State University in 1993, with a minor in Microbiology. She has 12 years of professional experience with a variety of vertebrate species, including surveys for sage-grouse and mountain plovers, though her work has focused on raptors during that period. Ms. Ottinger has worked throughout the U.S. and abroad. She joined Jones & Stokes as a Wildlife Biologist in 2004. She has strong raptor identification and handling skills, research experience, proven abilities in data analysis and technical writing, and has presented and/or published several articles in a variety of professional meetings and publications, respectively.

#### G-13.1.2 T&E Vegetation Species

*Consulting Firm: Habitat Management Inc. of Gillette, Wyoming*

Richard Bonine Jr.: Mr. Bonine has a Bachelor of Science degree in Agronomy from Kansas State University with significant study concentration in range, plant, and soil science. Mr. Bonine has 20 years of experience conducting vegetation and T&E surveys in Wyoming, New Mexico, Montana, Kansas, and Missouri. These surveys include baseline characterizations, T&E surveys, wetland delineations, and soil mapping delineations. Mr. Bonine has taken significant action to gain familiarly with Ute ladies'-tresses. These actions include consulting several taxonomic texts to gain an understanding of the distinguishing botanical characteristics and habitats of this species; visiting a know population of Ute ladies'-tresses located on Clear creek near Golden, Colorado where he evaluated the site for understory and canopy vegetation, associated soil series, and hydrology; discussed with several Wyoming wildlife biologists the known Ute ladies'-tresses habitat on Antelope Creek.

Scott Benson: Mr. Benson has conducted numerous research studies to quantify vegetation using line transect, point transect, quadrat and plotless techniques. These studies have been conducted to obtain quantitative baseline data for use in future comparisons, to monitor success of reclamation, and to monitor success of created wetlands. Scott has also prepared numerous vegetation maps in a variety of habitats, along with both quantitative and qualitative descriptions of habitat types. Scott has conducted numerous searches for federally-listed plant species, including blowout penstemon, Ute's ladies'-tresses, and Colorado butterfly plant, as well as searches for USFS, BLM, and state-listed rare plants. Mr. Benson has also conducted qualitative plant surveys for NEPA projects and prepared extensive plant lists to describe a variety of habitats.

### G-13.2 West Jacobs Ranch LBA Tract

#### G-13.2.1 T&E Animal Species

*Consulting Firm: Intermountain Resources of Laramie, Wyoming*

Jim Orpet: Mr. Orpet obtained a M.S degree in Range Management and a B.S. degree in Wildlife Management, both from the University of Wyoming. He has over 30 years experience in vegetation and wildlife surveys in Wyoming and adjacent states, primarily with baseline field inventories for mining and other energy development projects including T&E, candidate and sensitive species surveys for both plants and animals. Mr. Orpet has been involved in T&E surveys and research since 1976. Experience includes research and monitoring of bald eagle nests and roosts, grizzly bear research, black-footed ferret surveys and survey certification and Ute Ladies'-tresses surveys. Mr. Orpet and his staff discovered one of the nine currently known occurrences of the Ute ladies'-tresses in Wyoming.

Russell Tait: Mr. Tait earned a B.S degree in Wildlife Management with a minor in Range Management from the University of Wyoming. He has over 14 years experience in vegetation and wildlife surveys in Wyoming, Colorado and South Dakota. These surveys were primarily baseline field inventories and final bond release studies for energy and non-energy development projects including T&E, candidate and sensitive species surveys for both plants and animals. Mr. Tait's T&E survey experience includes bald eagle roost monitoring, bald eagle nest searches, Ute ladies'-tresses surveys and black-footed ferret surveys. Mr. Tait was part of a survey crew that discovered one of the nine known occurrences of the Ute ladies'-tresses in Wyoming, finding many of the individual plants himself.

#### G-13.2.2 T&E Vegetation Species

*Consulting Firm: Intermountain Resources (see same personnel above).*

## G-13.3 North and South Porcupine LBA Tracts

### G-13.3.1 T&E Animal Species

*Consulting Firm: Thunderbird/Jones & Stokes (see same personnel above).*

### G-13.3.2 T&E Vegetation Species

*Consulting Firm: BKS Environmental Associates, Inc of Gillette, Wyoming*

Dr. Brenda K. Schladweiler: Dr. Schladweiler obtained her Ph.D. in Soil Science from the University of Wyoming in 2003, her M.S. in Soil Science from the University of Wyoming in 1995, and her B.S. in Range Management (Land Rehabilitation) from Colorado State University in 1980.

Dr. Schladweiler has extensive experience over the last 24 years in conducting rare plant surveys. The following is a list of recent T&E plant studies she has conducted:

| Location | Date | Plants Surveyed |
|---|---|---|
| Wharf Mine, Lawrence Co., SD | 1992 | Various, State of SD Heritage Plants |
| Ferris Haggerty Mine, Carbon Co., WY | 1998 | Various, State of WY |
| Crow AML, Big Horn Co., MT | 1999 | Various, State of MT |
| Caballo Mine, Campbell Co., WY | 1999 | *Spiranthes diluvialis* |
| Wright Clinic AML, Campbell Co., WY | 1999 | *Spiranthes diluvialis* |
| Kane Environmental, Campbell Co., WY | 1999 | *Spiranthes diluvialis* |
| Atlantic City Mine, Knight Piesold, Fremont Co., WY | 2000 | *Spiranthes diluvialis* |
| Eagle Butte Mine, Campbell Co., WY | | *Spiranthes diluvialis* |
| West Antelope Mine, Converse Co., WY | 2001 | *Spiranthes diluvialis* |
| BRS, Bighorn Basin Water Project, Washakie Co., WY | 2001 | Various, State of Wyoming Plant |
| URS, Transmission Line, Campbell Co., WY | 2001 | *Spiranthes diluvialis* |
| Wright, (bike path) Campbell Co., WY | 2001 | *Spiranthes diluvialis* |
| Gillette, PCA sewer line, Campbell Co., WY | 2002-2004 | *Spiranthes diluvialis* |
| Gillette, PCA trunk line, Campbell Co., WY | 2002-2004 | *Spiranthes diluvialis* |
| Pinehaven (Wester-Wetstein), Crook Co., WY | 2003 | *Spiranthes diluvialis* |
| Spotted Horse, (CBMA CH4), Campbell Co., WY | 2003 | *Spiranthes diluvialis* |
| Bowers Oil (Antelope Creek)Campbell/ Converse Co., WY | 2003 | *Spiranthes diluvialis* |

| | | |
|---|---|---|
| Gillette, PCA Swanson Rd., Campbell Co., WY | 2003 | *Spiranthes diluvialis* |
| North Rochelle Mine USFS Survey, Campbell Co., WY | 2004 | Various USFS Sensitive Species for TBNG |
| Westport Oil & Gas, Nicholson POD, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| Devon Energy, Mustang POD, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| NARM, Beckwith Rd., Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| Yates Petroleum, Campbell Co., WY | 2004 | *Spiranthes diluvialis*; various USFS Sensitive Species for TBNG |
| PRCC, Ridgeroad USFS, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| Lance, Black Thunder POD, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| Devon Energy, Mulie POD, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| Devon Energy Whitetail POD, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |
| Devon Energy, Bighorn POD, Campbell Co., WY | 2004 | *Spiranthes diluvialis* |

Numerous actions have been taken by Dr. Schladweiler to become acquainted with the known locations and the appearance of *Spiranthes diluvialis*. Research has been conducted through the Wyoming Natural Diversity Database and the Internet for sensitive plants. In addition, she has actually visited the population on the unnamed tributary to Antelope Creek numerous times over the last 10 years. This known population verification was completed as part of a field survey conducted for Yates Petroleum Company in the Rochelle Hills POD, Campbell County, Wyoming on August 29, 2004. She has also visited the known population near Chugwater, Wyoming.

Dr. Schladweiler, on numerous occasions, has been in contact with Mr. Ernie Nelson, University of Wyoming, Rocky Mountain Herbarium, and George Jones, Wyoming Natural Diversity Database. In addition, she has consulted with Mr. Walt Fertig, previously from the University of Wyoming.

Katie Wilson: Ms. Wilson holds a B.S. in Environmental Studies with a minor in Biology from Bemidji State University, Bemidji, Minnesota (2005). Ms. Wilson has been employed by BKS since the spring of 2005. She has been conducting mineland reclamation monitoring for various coal mines in Campbell and Converse counties since her employment. She has also performed vegetation sampling for numerous CBNG projects and baseline vegetation surveys in the PRB. In addition, she has conducted rare plant species surveys, wetland delineations, and environmental compliance assessments. T&E plant survey experience includes:

- Visited an unnamed tributary of Antelope Creek and observed a Ute ladies'-tresses (*Spiranthes diluvialis*) population, 2005.
- Powder River Coal Company, Gold Mine Draw AVF Exchange. Ute ladies'-tresses orchid survey in Campbell County, Wyoming, 2005.
- West Roundup Resources, Inc., School Creek Mine. Ute ladies'-tresses orchid survey in Campbell County, Wyoming, 2005 and 2006.
- Devon Energy Corporation, Juniper Draw Unit. Ute ladies'-tresses orchid survey in Johnson County, Wyoming, 2005.
- Devon Energy Corporation, Crossroads Unit. Ute ladies'-tresses orchid survey in Johnson County, Wyoming, 2005.

Cindy Adams: Ms. Robinson holds a Masters of Business Administration (MBA) and a B.S. in Environmental Science from the University of Denver, Denver, Colorado (2005). Ms. Adams has been employed by BKS since April of 2006 conducting mineland reclamation monitoring for various coal mines in Campbell County, Wyoming. In addition, she has conducted rare plant species surveys, wetland delineations, and environmental compliance assessments. Ms. Adams has also visited a Barr's milkvetch (*Astragalus barrii*) site on USFS lands at the proposed School Creek Mine area when the species was blooming. She has also visited a Ute ladies'-tresses (*Spiranthes diluvialis*) population in bloom on an unnamed tributary of Antelope Creek. T&E and sensitive plant survey experience includes:

- West Roundup Resources, Inc., School Creek Mine. Barr's Milkvetch survey in Campbell County, Wyoming, May 2006.
- West Roundup Resources, Inc., School Creek Mine. Ute ladies'-tresses survey in Campbell County, Wyoming, August 2006.
- Thunder Basin Coal Company, Black Thunder Mine, West Hilight Field LBA Tract. Barr's milkvetch survey in Campbell County, Wyoming, August 2006.
- Wellstar Corporation (Jones and Stokes), Ute ladies'-tresses survey, March 2007.
- Composing amendment updates for North Antelope Rochelle Mine's Biological Assessment/Biological Evaluation.

Jamie Eberly: Jamie Eberly holds a B.S. in Rangeland Management (Rangeland Livestock Production) from Chadron State College, Chadron, Nebraska (2005). Ms. Eberly has been employed by BKS Environmental since the fall of 2006. She has been conducting mineland reclamation monitoring for various coal mines in Campbell and Converse counties, Wyoming since her employment. She has also conducted baseline vegetation monitoring for both small mine permits as well as coal and uranium operations in the PRB. In addition, she has conducted rare plant species surveys, wetland delineations, and environmental compliance assessments. T&E and sensitive plant survey experience includes:

- Williams Production Company (Jones and Stokes), West Cripple Creek POD, Campbell County, Wyoming. Barr's milkvetch survey, May 2007.

- Williams Production Company (Jones and Stokes). Rosy Palofaxia survey, May 2007.
- Powertech Corporation, Dewey-Burdock Project. T&E species and habitat survey, June 2007.
- Antelope Road Relocation Project, Campbell County, Wyoming. Biological Assessment /Biological Evaluation, April 2008.

Melody S. Smith: Ms. Smith obtained a B.S. in Rangeland Ecology and Watershed Management from the University of Wyoming in 1996. Ms. Smith was employed by BKS from 2000 to September 2006 and is experienced in vegetation monitoring, vegetation community mapping, soils sampling, soils mapping, rare plant species surveys, wetland delineations, and environmental compliance assessments. Rare plant (including species of special concern) monitoring and survey experience includes:

- Mimbres figwort (*Scrophularia macrantha*) survey, Hurley, New Mexico, 1997.
- Sneed pincushion cactus (*Coryphantha sneedii*) monitoring, Fort Bliss, Texas, 1998.
- Alamo beardtongue (*Penstemon alamosensis*) monitoring, Fort Bliss, Texas, 1998.
- Hueco rock daisy (*Perityle huecoensis*) monitoring, Fort Bliss, Texas, 1998.
- Desert night-blooming cereus (*Peniocereus greggii* var. *greggii*) monitoring, Fort Bliss, Texas, 1998.
- Organ mountains evening primrose (*Oenothera organensis*) monitoring, Fort Bliss, Texas, 1998.
- Ute Ladies' Tresses (*Spiranthes diluvialis*) surveys, Campbell and Sheridan counties, Wyoming, 2002-2005. Nine individuals of nearest known population on unnamed tributary of Antelope Creek identified and observed in August 2003, expert contacts at various times by BKS include Ernie Nelson and Walt Fertig (University of Wyoming) as well as Bonnie Heidel and George Jones (Wyoming Natural Diversity Database).
- Barr's milkvetch (*Astragalus barrii*) surveys, various locations, Campbell County, Wyoming, 2004 and 2005. New populations identified in 2005.

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# APPENDIX H

BLM SENSITIVE SPECIES
AND
USFS REGION 2 SENSITIVE SPECIES AND
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# H-1.0 PROJECT AREA DESCRIPTIONS

## H-1.1 North Hilight Field, South Hilight Field, and West Hilight Field LBA Tracts

Under the Proposed Actions for the North Hilight Field, South Hilight Field, and West Hilight Field LBA Tracts, Bureau of Land Management (BLM) would hold a separate competitive lease sale and issue a separate lease for the federal coal lands included in each tract as applied for by the applicant, Ark Land Company (ALC), or under other Alternatives (see Figures 2-1, 2-2, and 2-3, respectively, and land descriptions in Sections 2.1, 2.2, and 2.3, respectively, of this EIS). In each case, it is assumed that the applicant for the tracts, ALC, would be the successful bidder on each tract, and that the tract would be mined as a maintenance lease for the existing Black Thunder Mine.

The surface estate on the North Hilight Field LBA Tract as applied for is composed of privately owned lands. Under Alternative 2, additional lands, including federal lands managed by U.S. Department of Agriculture-Forest Service (USFS), were added by BLM to be analyzed for possible inclusion in that tract. The surface estate on the South Hilight Field LBA Tract as applied for is composed of privately owned and federally owned lands managed by USFS. Under Alternative 2, additional lands, including federal lands managed by USFS, were added by BLM to be analyzed for possible inclusion in that tract. The surface estate on the West Hilight Field LBA Tract as applied for is composed of privately owned and federally owned lands managed by USFS. Under Alternatives 2 and 3, additional lands, including federal lands managed by USFS, were added by BLM to be analyzed for possible inclusion in that tract. Additional information on surface ownership and current land uses can be found in Section 3.11 of this EIS. All of these federally owned lands administered by the USFS are within the Thunder Basin National Grasslands (TBNG).

## H-1.2 West Jacobs Ranch LBA Tract

Under the Proposed Action for the West Jacobs Ranch LBA Tract, BLM would hold a competitive lease sale and issue a lease for the federal coal lands included in the tract as applied for by the applicant, Jacobs Ranch Coal Company (JRCC), or under another Alternative (see Figure 2-4 and land descriptions in Section 2.4 of this EIS).

The Jacobs Ranch Mine was acquired by Arch Coal, Inc. on October 1, 2009. ALC, a wholly-owned subsidiary of Arch Coal, Inc., will integrate the mining operations of the Jacobs Ranch Mine with the mining operations of the Black Thunder Mine. ALC's intention is to consolidate the permits for the Jacobs Ranch Mine and the Black Thunder Mine. In this Biological Evaluation (BE), the applicant for the West Jacobs Ranch LBA Tract will henceforth be referred to as ALC. It is assumed that the applicant for the tract, ALC, would be the

successful bidder, and that the tract would be mined as a maintenance lease for the existing Jacobs Ranch Mine.

The surface estate on the West Jacobs Ranch LBA Tract as applied for is composed entirely of privately owned lands. Under Alternative 2, additional lands, all privately owned, were added by BLM to be analyzed for possible inclusion in that tract. Additional information on surface ownership and current land uses can be found in Section 3.11 of this EIS.

### H-1.3 North and South Porcupine LBA Tracts

Under the Proposed Actions for the North Porcupine and South Porcupine LBA Tracts, BLM would hold a separate competitive lease sale and issue a separate lease for the federal coal lands included in each tract as applied for by the applicant, BTU Western Resources, Inc. (BTU), or under other Alternatives (see Figures 2-5 and 2-6, respectively, and land descriptions in Sections 2.5 and 2.6, respectively, of this EIS). In each case, it is assumed that the applicant for the tracts, BTU, would be the successful bidder on each tract, and that the tract would be mined as a maintenance lease for the existing North Antelope Rochelle Mine.

The surface estate on the North Porcupine LBA Tract as applied for is composed of privately owned and federally owned lands managed by USFS. Under Alternative 2, additional lands, including federal lands managed by USFS, were added by BLM to be analyzed for possible inclusion in that tract. The surface estate on the South Porcupine LBA Tract as applied for is composed of privately owned and federally owned lands managed by USFS. Under Alternative 2, additional lands, including federal lands managed by USFS, were added by BLM to be analyzed for possible inclusion in that tract. Additional information on surface ownership and current land uses can be found in Section 3.11 of this EIS. All of these federally owned lands administered by the USFS are within the TBNG.

### H-1.4 Description of General Analysis Areas

The BLM study area for each of these six LBA tracts is defined as the original tract as applied for, plus all lands that BLM is considering adding to the tract. The general analysis area for each of these six LBA tracts is defined as the BLM study area plus surrounding lands within a ¼-mile perimeter that could be disturbed by mining the coal within the BLM study area where future mining disturbance could occur. The general analysis area for the North Hilight Field LBA Tract does not include lands within Black Thunder Mine's current permit area. The general analysis area for the South Hilight Field LBA Tract includes some lands within Black Thunder Mine's current permit area. The general analysis area for the West Hilight Field LBA Tract does not include lands within Black Thunder Mine's current permit area. The general analysis area for the West Jacobs Ranch LBA Tract does not include lands within Jacobs Ranch Mine's current permit area. The general analysis area for the North Porcupine

LBA Tract is almost entirely within North Antelope Rochelle Mine's current permit area. The general analysis area for the South Porcupine LBA Tract is almost entirely within North Antelope Rochelle Mine's current permit area. For the purpose of this sensitive species evaluation, the general Wright analysis area is defined as the area encompassing all six of these LBA tracts' general analysis areas.

The minerals within the general analysis area for each of these six LBA tracts are managed by BLM, and the federally owned surface within these general analysis areas are administered by the USFS; therefore, both BLM and USFS sensitive species evaluations must be completed as part of this EIS.

## H-2.0 BLM SENSITIVE SPECIES EVALUATION

### H-2.1 Introduction

BLM Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. The authority for this policy and guidance comes from the Endangered Species Act (ESA), as amended; Title II of the Sikes Act, as amended; the Federal Land Policy Management Act of 1976 (FLPMA) (43 U.S.C. 1716); Department Manual 235.1.1A; and BLM Manual 6840.06 E. Sensitive Species.

The goals of BLM's sensitive species policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems.
- Ensure sensitive species are considered in land management decisions.
- Prevent a need for species listing under the ESA.
- Prioritize needed conservation work with an emphasis on habitat.

### H-2.2 Species Habitat and Occurrence

BLM sensitive species were listed for their ranges within the BLM Buffalo Field Office (24 species total). Some sensitive species could or do occur within one or more of the general analysis areas for these six LBA tracts. Specialized habitat requirements (i.e., caves, cliffs, coniferous forests, calcareous rock outcrops) make occupation for other sensitive species unlikely.

Tables H-1 through H-6 list BLM sensitive species, summarize their habitat requirements, and indicate if they have been observed on or around the general analysis areas for the LBA tracts. These tables represent the most current sensitive species lists (BLM 2002), and observations were based on field surveys and file searches completed in 2007 and 2008. Additional information on occurrences of these species on the tracts and surrounding wildlife survey areas can be found in Section 3.10 of this EIS.

Table H-1. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the North Hilight Field LBA Tract.

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Beaver ponds, permanent water in plains and foothills | No[1] |
| Spotted frog (*Ranus pretiosa*) | Ponds, sloughs, small streams | No[1] |
| **Birds** | | |
| Baird's sparrow (*Ammodramus bairdii*) | Grasslands, weedy fields | No |
| Brewer's sparrow (*Spizella breweri*) | Basin-prairie shrub | Yes, Common Breeder |
| Burrowing owl (*Athene cunicularia*) | Grasslands, basin-prairie shrub | Yes, Uncommon Breeder |
| Ferruginous hawk (*Buteo regalis*) | Basin-prairie shrub, grasslands, rock outcrops | Yes, Common Breeder |
| Greater sage-grouse (*Centrocercus urophasianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Historic Common Breeder, Recent Occasional Breeder |
| Loggerhead shrike (*Lanius ludovicianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Forager |
| Long-billed curlew (*Numenius americanus*) | Grasslands, plains, foothills, wet meadows | Yes, Infrequent Migrant |
| Northern goshawk (*Accipiter gentilis*) | Conifer and deciduous forests | No[1] |
| Peregrine falcon (*Falco peregrinus*) | Cliffs usually along waterways | No[1] |
| Sage sparrow (*Amphispiza billneata*) | Basin-prairie shrub, mountain-foothill shrub | No[1] |
| Sage thrasher (*Oreoscoptes montanus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Trumpeter swan (*Cygnus buccinator*) | Lakes, ponds, rivers | No[1] |
| White-faced ibis (*Plegadis chihi*) | Marshes, wet meadows | No[1] |
| Yellow-billed cuckoo (*Coccyzus americanus*) | Open woodlands, streamside willow and alder groves | No[1] |

Table H-1. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the North Hilight Field LBA Tract (Continued).

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Fish** | | |
| Yellowstone cutthroat trout (*Oncoryhynchus clarki*) | Cold water streams and lakes | No[1] |
| **Mammals** | | |
| Fringed myotis (*Myotis thysanodes*) | Conifer forests, woodland chaparral, caves and mines | No[1] |
| Long-eared myotis (*Myotis evotis*) | Conifer and deciduous forest, caves and mines | No[1] |
| Spotted bat (*Euderma maculatum*) | Cliffs over perennial water, basin-prairie shrub | No[1] |
| Swift fox (*Vulpes velox*) | Grasslands | No |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Forests, basin-prairie shrub, caves and mines | No |
| **Plants** | | |
| Porter's sagebrush (*Artemisia porteri*) | Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes; 5,300-6,500 ft. elev. | No |
| William's wafer parsnip (*Cymopterus williamsii*) | Open ridgetops and upper slopes with exposed limestone outcrops or rockslides; 6,000-8,300 ft. elev. | No[1] |

[1] Habitat generally lacking or very limited

[2] Former listed or candidate species under the ESA automatically revert to BLM Sensitive Species upon delisting or removal from the ESA listing process.

Table H-2. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the South Hilight Field LBA Tract.

| **Common Name** (*scientific name*) | **Habitat** | **Field Observations** |
|---|---|---|
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Beaver ponds, permanent water in plains and foothills | No[1] |
| Spotted frog (*Ranus pretiosa*) | Ponds, sloughs, small streams | No[1] |
| **Birds** | | |
| Baird's sparrow (*Ammodramus bairdii*) | Grasslands, weedy fields | No[1] |
| Brewer's sparrow (*Spizella breweri*) | Basin-prairie shrub | Yes, Common Breeder |
| Burrowing owl (*Athene cunicularia*) | Grasslands, basin-prairie shrub | No |
| Ferruginous hawk (*Buteo regalis*) | Basin-prairie shrub, grasslands, rock outcrops | Yes, Common Breeder |
| Greater sage-grouse (*Centrocercus urophasianus*) | Basin-prairie shrub, mountain-foothill shrub | No |
| Loggerhead shrike (*Lanius ludovicianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Potential Breeder |
| Long-billed curlew (*Numenius americanus*) | Grasslands, plains, foothills, wet meadows | Yes, Infrequent Migrant |
| Northern goshawk (*Accipiter gentilis*) | Conifer and deciduous forests | No[1] |
| Peregrine falcon (*Falco peregrinus*) | Cliffs usually along waterways | No[1] |
| Sage sparrow (*Amphispiza billneata*) | Basin-prairie shrub, mountain-foothill shrub | No[1] |
| Sage thrasher (*Oreoscoptes montanus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Trumpeter swan (*Cygnus buccinator*) | Lakes, ponds, rivers | No[1] |
| White-faced ibis (*Plegadis chihi*) | Marshes, wet meadows | No[1] |
| Yellow-billed cuckoo (*Coccyzus americanus*) | Open woodlands, streamside willow and alder groves | No[1] |

Table H-2. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the South Hilight Field LBA Tract (Continued).

| **Common Name** (*scientific name*) | **Habitat** | **Field Observations** |
|---|---|---|
| **Fish** | | |
| Yellowstone cutthroat trout (*Oncoryhynchus clarki*) | Cold water streams and lakes | No[1] |
| **Mammals** | | |
| Fringed myotis (*Myotis thysanodes*) | Conifer forests, woodland chaparral, caves and mines | No[1] |
| Long-eared myotis (*Myotis evotis*) | Conifer and deciduous forest, caves and mines | No[1] |
| Spotted bat *(Euderma maculatum)* | Cliffs over perennial water, basin-prairie shrub | No[1] |
| Swift fox (*Vulpes velox*) | Grasslands | No[1] (one sighting in 24 years of annual monitoring) |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Forests, basin-prairie shrub, caves and mines | No |
| **Plants** | | |
| Porter's sagebrush (*Artemisia porteri*) | Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes; 5,300-6,500 ft. elev. | No |
| William's wafer parsnip (*Cymopterus williamsii*) | Open ridgetops and upper slopes with exposed limestone outcrops or rockslides; 6,000-8,300 ft. elev. | No[1] |

[1] Habitat generally lacking or very limited

[2] Former listed or candidate species under the ESA automatically revert to BLM Sensitive Species upon delisting or removal from the ESA listing process.

Table H-3. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the West Hilight Field LBA Tract.

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Beaver ponds, permanent water in plains and foothills | No |
| Spotted frog (*Ranus pretiosa*) | Ponds, sloughs, small streams | No[1] |
| **Birds** | | |
| Baird's sparrow (*Ammodramus bairdii*) | Grasslands, weedy fields | No |
| Brewer's sparrow (*Spizella breweri*) | Basin-prairie shrub | Yes, Common Breeder |
| Burrowing owl (*Athene cunicularia*) | Grasslands, basin-prairie shrub | No (one nest burrow just beyond general analysis area) |
| Ferruginous hawk (*Buteo regalis*) | Basin-prairie shrub, grasslands, rock outcrops | Yes, Common Breeder |
| Greater sage-grouse (*Centrocercus urophasianus*) | Basin-prairie shrub, mountain-foothill shrub | No, Infrequent Breeder |
| Loggerhead shrike (*Lanius ludovicianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Potential Breeder |
| Long-billed curlew (*Numenius americanus*) | Grasslands, plains, foothills, wet meadows | Yes, Infrequent Migrant |
| Northern goshawk (*Accipiter gentilis*) | Conifer and deciduous forests | No[1] |
| Peregrine falcon (*Falco peregrinus*) | Cliffs usually along waterways | No[1] |
| Sage sparrow (*Amphispiza billneata*) | Basin-prairie shrub, mountain-foothill shrub | No[1] |
| Sage thrasher (*Oreoscoptes montanus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Trumpeter swan (*Cygnus buccinator*) | Lakes, ponds, rivers | No[1] |
| White-faced ibis (*Plegadis chihi*) | Marshes, wet meadows | No |
| Yellow-billed cuckoo (*Coccyzus americanus*) | Open woodlands, streamside willow and alder groves | No[1] |

Table H-3. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the West Hilight Field LBA Tract (Continued).

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Fish** | | |
| Yellowstone cutthroat trout (*Oncoryhynchus clarki*) | Cold water streams and lakes | No[1] |
| **Mammals** | | |
| Fringed myotis (*Myotis thysanodes*) | Conifer forests, woodland chaparral, caves and mines | No[1] |
| Long-eared myotis (*Myotis evotis*) | Conifer and deciduous forest, caves and mines | No[1] |
| Spotted bat (*Euderma maculatum*) | Cliffs over perennial water, basin-prairie shrub | No[1] |
| Swift fox (*Vulpes velox*) | Grasslands | No[1] |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Forests, basin-prairie shrub, caves and mines | No |
| **Plants** | | |
| Porter's sagebrush (*Artemisia porteri*) | Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes; 5,300-6,500 ft. elev. | No |
| William's wafer parsnip (*Cymopterus williamsii*) | Open ridgetops and upper slopes with exposed limestone outcrops or rockslides; 6,000-8,300 ft. elev. | No[1] |

[1] Habitat generally lacking or very limited

[2] Former listed or candidate species under the ESA automatically revert to BLM Sensitive Species upon delisting or removal from the ESA listing process.

Table H-4. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the West Jacobs Ranch LBA Tract.

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Beaver ponds, permanent water in plains and foothills | Yes, Breeder |
| Spotted frog (*Ranus pretiosa*) | Ponds, sloughs, small streams | No[1] |
| **Birds** | | |
| Baird's sparrow (*Ammodramus bairdii*) | Grasslands, weedy fields | No |
| Brewer's sparrow (*Spizella breweri*) | Basin-prairie shrub | Yes, Common Breeder |
| Burrowing owl (*Athene cunicularia*) | Grasslands, basin-prairie shrub | Yes, Breeder |
| Ferruginous hawk (*Buteo regalis*) | Basin-prairie shrub, grasslands, rock outcrops | Yes, Common Breeder |
| Greater sage-grouse (*Centrocercus urophasianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Historic Breeder |
| Loggerhead shrike (*Lanius ludovicianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Long-billed curlew (*Numenius americanus*) | Grasslands, plains, foothills, wet meadows | Yes, Rare Spring Migrant, Uncommon Potential Breeder |
| Northern goshawk (*Accipiter gentilis*) | Conifer and deciduous forests | No[1] |
| Peregrine falcon (*Falco peregrinus*) | Cliffs usually along waterways | No, Limited Habitat, Migrant |
| Sage sparrow (*Amphispiza billneata*) | Basin-prairie shrub, mountain-foothill shrub | No |
| Sage thrasher (*Oreoscoptes montanus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Trumpeter swan (*Cygnus buccinator*) | Lakes, ponds, rivers | No[1] |
| White-faced ibis (*Plegadis chihi*) | Marshes, wet meadows | No[1] |
| Yellow-billed cuckoo (*Coccyzus americanus*) | Open woodlands, streamside willow and alder groves | No[1] |

Table H-4. BLM Sensitive Species for the Buffalo Field Office, Habitat Requirements, and Observations within the General Analysis Area for the West Jacobs Ranch LBA Tract (Continued).

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Fish** | | |
| Yellowstone cutthroat trout (*Oncoryhynchus clarki*) | Cold water streams and lakes | No[1] |
| **Mammals** | | |
| Fringed myotis (*Myotis thysanodes*) | Conifer forests, woodland chaparral, caves and mines | No[1] |
| Long-eared myotis (*Myotis evotis*) | Conifer and deciduous forest, caves and mines | No[1] |
| Spotted bat *(Euderma maculatum)* | Cliffs over perennial water, basin-prairie shrub | No[1] |
| Swift fox (*Vulpes velox*) | Grasslands | Yes, Opportunistic Sightings (Spring and Fall, 2007) |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Forests, basin-prairie shrub, caves and mines | No[1] |
| **Plants** | | |
| Porter's sagebrush (*Artemisia porteri*) | Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes; 5,300-6,500 ft. elev. | No |
| William's wafer parsnip (*Cymopterus williamsii*) | Open ridgetops and upper slopes with exposed limestone outcrops or rockslides; 6,000-8,300 ft. elev. | No[1] |

[1] Habitat generally lacking or very limited

[2] Former listed or candidate species under the ESA automatically revert to BLM Sensitive Species upon delisting or removal from the ESA listing process.

Table H-5. BLM Sensitive Species for the Buffalo Field Office and Habitat Requirements and Observations within the General Analysis Area for the North Porcupine LBA Tract.

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Beaver ponds, permanent water in plains and foothills | No[1] |
| Spotted frog (*Ranus pretiosa*) | Ponds, sloughs, small streams | No[1] |
| **Birds** | | |
| Baird's sparrow (*Ammodramus bairdii*) | Grasslands, weedy fields | No |
| Brewer's sparrow (*Spizella breweri*) | Basin-prairie shrub | Yes, Common Breeder |
| Burrowing owl (*Athene cunicularia*) | Grasslands, basin-prairie shrub | Yes, Uncommon Breeder |
| Ferruginous hawk (*Buteo regalis*) | Basin-prairie shrub, grasslands, rock outcrops | Yes, Breeder |
| Greater sage-grouse (*Centrocercus urophasianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Common Breeder |
| Loggerhead shrike (*Lanius ludovicianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Long-billed curlew (*Numenius americanus*) | Grasslands, plains, foothills, wet meadows | Yes, Infrequent Migrant |
| Northern goshawk (*Accipiter gentilis*) | Conifer and deciduous forests | No[1] |
| Peregrine falcon (*Falco peregrinus*) | Cliffs usually along waterways | No[1] |
| Sage sparrow (*Amphispiza billneata*) | Basin-prairie shrub, mountain-foothill shrub | No[1] |
| Sage thrasher (*Oreoscoptes montanus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Trumpeter swan (*Cygnus buccinator*) | Lakes, ponds, rivers | No[1] |
| White-faced ibis (*Plegadis chihi*) | Marshes, wet meadows | No[1] |
| Yellow-billed cuckoo (*Coccyzus americanus*) | Open woodlands, streamside willow and alder groves | No[1] |

Table H-5. BLM Sensitive Species for the Buffalo Field Office and Habitat Requirements and Observations within the General Analysis Area for the North Porcupine LBA Tract (Continued).

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Fish** | | |
| Yellowstone cutthroat trout (*Oncoryhynchus clarki*) | Cold water streams and lakes | No[1] |
| **Mammals** | | |
| Fringed myotis (*Myotis thysanodes*) | Conifer forests, woodland chaparral, caves and mines | No[1] |
| Long-eared myotis (*Myotis evotis*) | Conifer and deciduous forest, caves and mines | No[1] |
| Spotted bat *(Euderma maculatum)* | Cliffs over perennial water, basin-prairie shrub | No[1] |
| Swift fox (*Vulpes velox*) | Grasslands | No[1] |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Forests, basin-prairie shrub, caves and mines | No |
| **Plants** | | |
| Porter's sagebrush (*Artemisia porteri*) | Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes; 5,300-6,500 ft. elev. | No |
| William's wafer parsnip (*Cymopterus williamsii*) | Open ridgetops and upper slopes with exposed limestone outcrops or rockslides; 6,000-8,300 ft. elev. | No[1] |

[1] Habitat generally lacking or very limited
[2] Former listed or candidate species under the ESA automatically revert to BLM Sensitive Species upon delisting or removal from the ESA listing process.

Table H-6. BLM Sensitive Species for the Buffalo Field Office and Habitat Requirements and Observations within the General Analysis Area for the South Porcupine LBA Tract.

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Beaver ponds, permanent water in plains and foothills | No[1] |
| Spotted frog (*Ranus pretiosa*) | Ponds, sloughs, small streams | No[1] |
| **Birds** | | |
| Baird's sparrow (*Ammodramus bairdii*) | Grasslands, weedy fields | No[1] |
| Brewer's sparrow (*Spizella breweri*) | Basin-prairie shrub | Yes, Common Breeder |
| Burrowing owl (*Athene cunicularia*) | Grasslands, basin-prairie shrub | No |
| Ferruginous hawk (*Buteo regalis*) | Basin-prairie shrub, grasslands, rock outcrops | Yes, Historic Breeder |
| Greater sage-grouse (*Centrocercus urophasianus*) | Basin-prairie shrub, mountain-foothill shrub | No |
| Loggerhead shrike (*Lanius ludovicianus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Long-billed curlew (*Numenius americanus*) | Grasslands, plains, foothills, wet meadows | Yes, Infrequent Migrant |
| Northern goshawk (*Accipiter gentilis*) | Conifer and deciduous forests | No[1] |
| Peregrine falcon (*Falco peregrinus*) | Cliffs usually along waterways | No[1] |
| Sage sparrow (*Amphispiza billneata*) | Basin-prairie shrub, mountain-foothill shrub | No[1] |
| Sage thrasher (*Oreoscoptes montanus*) | Basin-prairie shrub, mountain-foothill shrub | Yes, Uncommon Breeder |
| Trumpeter swan (*Cygnus buccinator*) | Lakes, ponds, rivers | No[1] |
| White-faced ibis (*Plegadis chihi*) | Marshes, wet meadows | No[1] |
| Yellow-billed cuckoo (*Coccyzus americanus*) | Open woodlands, streamside willow and alder groves | No[1] |

Table H-6. BLM Sensitive Species for the Buffalo Field Office and Habitat Requirements and Observations within the General Analysis Area for the South Porcupine LBA Tract (Continued).

| **Common Name (*scientific name*)** | **Habitat** | **Field Observations** |
|---|---|---|
| **Fish** | | |
| Yellowstone cutthroat trout (*Oncoryhynchus clarki*) | Cold water streams and lakes | No[1] |
| **Mammals** | | |
| Fringed myotis (*Myotis thysanodes*) | Conifer forests, woodland chaparral, caves and mines | No[1] |
| Long-eared myotis (*Myotis evotis*) | Conifer and deciduous forest, caves and mines | No[1] |
| Spotted bat *(Euderma maculatum)* | Cliffs over perennial water, basin-prairie shrub | No[1] |
| Swift fox (*Vulpes velox*) | Grasslands | No |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Forests, basin-prairie shrub, caves and mines | No |
| **Plants** | | |
| Porter's sagebrush (*Artemisia porteri*) | Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes; 5,300-6,500 ft. elev. | No |
| William's wafer parsnip (*Cymopterus williamsii*) | Open ridgetops and upper slopes with exposed limestone outcrops or rockslides; 6,000-8,300 ft. elev. | No[1] |

[1] Habitat generally lacking or very limited

[2] Former listed or candidate species under the ESA automatically revert to BLM Sensitive Species upon delisting or removal from the ESA listing process.

## H-3.0 USFS REGION 2 SENSITIVE SPECIES EVALUATION

### H-3.1 Introduction

Species that have been identified by the Regional Forester as sensitive species must be considered for the Wright Area Coal Lease Applications because the general analysis areas for North Hilight Field, South Hilight Field, West Hilight

Field, North Porcupine, and South Porcupine LBA Tracts include federal lands administered by the USFS. There is no USFS administered surface within the general analysis area for the West Jacobs Ranch LBA Tract. The purpose of this section of this Appendix is to provide information about the potential environmental effects that leasing the USFS administered lands would have on USFS Region 2 Sensitive wildlife and vegetative species (terrestrial and aquatic).

USFS classifies species as "sensitive" when they meet one or more of the following three criteria: 1) the species is declining in numbers or occurrences, and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend; 2) the species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline; and 3) the species' population or habitat is stable but limited. In addition to these criteria, a ranking system is used to identify species for sensitive status, which is outlined in USFS Manual 2670-2671. Table H-7 lists species that have been identified as "sensitive" for USFS Region 2, TBNG (USFS 2007). This table also provides information about the status of the species on the TBNG as a whole (not exclusive to USFS lands within the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts).

The USFS Douglas Ranger District has reviewed the entire list of animal and plant sensitive species for USFS Region 2 and eliminated from further review those species that occur on the TBNG but are geographically or biologically outside of any effects of the Wright Area Coal Lease Applications. Tables H-8 and H-9 list the current status of USFS Region 2 sensitive species and species of local concern on TBNG and on USFS lands in the general Wright analysis area. These tables also indicate suitability of habitat for each species specific only to the USFS lands in the general Wright analysis area. The seven plant species that are listed in Table H-9 were moved off the Region 2 sensitive species list and are now species that are of local concern (Roche 2009). The species listed in Tables H-8 and H-9 have been identified as definitely or potentially inhabiting the USFS lands within the general Wright analysis area, either seasonally or year-round, and therefore may be potentially affected by one or more of the Proposed Actions or Alternatives.

Table H-7. USFS Region 2 Sensitive Species List and Status for the Entire Thunder Basin National Grassland (USFS 2007).

Status Code:

K = Known occurrence in vicinity. Date of last observation indicates that species still occur in area.

N = No recent observations; surveys recently completed; may be historic records; potential habitat possible.

S = Suspected occurrence. May be historic records but no recent observations. Suitable habitat likely.

U = Unknown occurrence, more surveys may be needed, may be historic records, potential habitat possible.

D = Dismissed from further analysis. The proposed project area is located outside of the species current and historic distribution.

| ***Scientific Name*** | **Common Name** | **Status on TBNG** |
|---|---|---|
| **Plants: Ferns and Allies** | | |
| *Botrychium ascendens* | Trianglelobe moonwort | U |
| *Botrychium campestre* | Prairie moonwort | S |
| *Botrychium furcatum* | Forkleaved moonwort | U |
| *Botrychium lineare* | Narrowleaf moonwort | S |
| *Botrychium paradoxum* | Peculiar moonwort | U |
| *Lycopodium complanatum* | Crowfoot clubmoss | U |
| *Selaginella selaginoides* | Northern spike-moss | U |
| | | |
| **Plants: Monocots** | | |
| *Amerorchis rotundifolia* | Round leaved orchid | U |
| *Calochortus flexuosus* | Weakstem mariposalily | U |
| *Carex alopecoidea* | Foxtail sedge | S |
| *Carex diandra* | Lesserpanicled sedge | U |
| *Carex livida* | Livid sedge | U |
| *Cypripedium montanum* | Mountain lady's slipper | U |
| *Cypripedium parvijlorum* | Smallyellow ladyslipper | U |
| *Eleocharis elliptica* | Elliptic spikerush | S |
| *Epipactis gigantea* | Giant helle borine | U |
| *Eriophorum altaicum* var. *neogaeum* | Altai cottongrass | U |
| *Eriophorum chamissonis* | Chamisso cottonsedge | U |
| *Eriophorum gracile* | Slender cottonsedge | U |
| *Festuca hallii* | Hall's Fescue | S |
| *Kobresia simpliciuscula* | Simple Kobresia | U |
| *Liparis loeselii* | Loesel's twayblade | U |
| *Malaxis brachypoda* | Adder's-mouth | U |
| *Platanthera orbiculata* | Large roundleafed orchid | U |
| *Ptilagrostis porteri* | Colorado Falseneedlegrass | U |
| *Schoenoplectus hallii* | Hall's bulrush | U |
| *Triteleia grandiflora* | Largeflower triteleia | S |

Table H-7. USFS Region 2 Sensitive Species List and Status for the Entire Thunder Basin National Grassland (Continued).

| ***Scientific Name*** | **Common Name** | **Status on TBNG** |
|---|---|---|
| **Plants: Dicots** | | |
| *Aquilegia chrysantha* var. *rydbergii* | Golden Columbine | U |
| *Aquilegia laramiensis* | Laramie Columbine | U |
| *Armeria maritima* var. *siberica* | Sea pink | U |
| *Asclepias uncialis* | Dwarf milkweed | U |
| *Astragalus barrii* | Barr's milkvetch | K |
| *Astragalus leptaleus* | Park milkvetch | U |
| *Astragalus missouriensis* var. *humistratus* | Missouri milkvetch | U |
| *Astragalus proximus* | Aztec milkvetch | U |
| *Astragalus ripleyi* | Ripleys milkvetch | U |
| *Astragalus wetherillii* | Wetherill milkvetch | U |
| *Braya glabella* | Smooth rockcress | U |
| *Chenopodium cycloides* | Sandhill goosefoot | U |
| *Cirsium perplexans* | Rocky Mountain thistle | U |
| *Descurainia torulosa* | Wind River tansymustard | U |
| *Draba exunguiculata* | Grays Peak whitlowgrass | U |
| *Draba grayana* | Hitchcock Gray's Peak whitlow-grass | U |
| *Draba smithii* | Smiths whitlow-grass | U |
| *Drosera anglica* | English sundew | U |
| *Drosera rotundifolia* | Roundleaf sundew | U |
| *Eriogonum brandegeei* | Brandegee wildbuckwheat | U |
| *Eriogonum exilifolium* | Drop-leaf wild buckwheat | S |
| *Eriogonum visheri* | Visher's buckwheat | S |
| *Gilia sedifolia* | Purple false gily-flower | U |
| *Ipomopsis aggregata* ssp. *weberi* | Weber's scarlet gilia | U |
| *Ipomopsis globularis* | Globe gilia | U |
| *Ipomopsis polyantha* | Pagosa skyrocket | U |
| *Lesquerella fremontii* | Fremont's bladderpod | U |
| *Lesquerella pruinosa* | Pagosa Springs bladderpod | U |
| *Machaeranthera coloradoensis* | Colorado tansymustard | U |
| *Mimulus gemmiparus* | Weber's monkeyflower | U |
| *Neoparrya lithophila* | Rock-loving aletes | U |
| *Oenothera harringtonii* | Harrington's oenothera | U |
| *Oreoxis humilis* | Pikes Peak spring parsley | U |
| *Parnassia kotzebuei* | Kotzebue's grass-of-Parnassus | U |
| *Penstemon absarokensis* | Absaroka penstemon | U |

Table H-7. USFS Region 2 Sensitive Species List and Status for the Entire Thunder Basin National Grassland (Continued).

| ***Scientific Name*** | **Common Name** | **Status on TBNG** |
|---|---|---|
| **Plants: Dicots (continued)** | | |
| *Penstemon caryi* | Cary beardtongue | U |
| *Penstemon degeneri* | Degener's penstemon | U |
| *Penstemon harringtonii* | Harrington's beardtongue | S |
| *Phacelia scopulina* var. *submutica* | Debeque scorpionweed | U |
| *Physaria didymocarpa* var. *lanata* | Woolly twinpod | S |
| *Physaria pulvinata* | Cushion bladderpod | U |
| *Potentilla rupincola* | Front Range cinquefoil | U |
| *Primula egaliksensis* | Greenland primrose | U |
| *Pyrrocoma carthamoides* var. *subsquarrosa* | Absoroka goldenweed | U |
| *Pyrrocoma clementis* var. *villosa* | Tranquil goldenweed | U |
| *Pyrrocoma integrifolia* | Many-stemmed goldenweed | U |
| *Ranunculus karelinii* | Frosty buttercup | U |
| *Rubus arcticus* ssp. *acaulis* | Arctic bramble | U |
| *Salix arizonica* | Arizona willow | U |
| *Salix barrattiana* | Barrat willow | U |
| *Salix candida* | Sage willow | U |
| *Salix myrtillifolia* | Myrtleleaf willow | U |
| *Salix serissima* | Autumn willow | U |
| *Sanguinaria canadensis* | Bloodroot | U |
| *Shoshonea pulvinata* | Shoshonia | U |
| *Thalictrum heliophilum* | Sun-loving meadowrue | U |
| *Townsendia condensata* var. *anomala* | Cushion townsenddaisy | U |
| *Utricularia minor* | Lesser bladderpod | U |
| *Viburnum opulus* var. *americanum* | Highbush-cranberry | S |
| *Viola selkirkii* | Great-spurred violet | U |
| | | |
| **Fish** | | |
| *Nocomis biguttatus* | Hornyhead chub | D |
| *Couesius plumbeus* | Lake chub | U |
| *Gila pandora* | Rio Grande chub | D |
| *Gila robusta* | Roundtail chub | D |
| *Macrhybopsis gelida* | Sturgeon chub | U |
| *Phoxinus neogaeus* | Finescale dace | U |
| *Margariscus margarita* | Pearl dace | U |

Table H-7. USFS Region 2 Sensitive Species List and Status for the Entire Thunder Basin National Grassland (Continued).

| ***Scientific Name*** | **Common Name** | **Status on TBNG** |
|---|---|---|
| **Fish (continued)** | | |
| *Phoxinus eos* | Northern redbelly dace | D |
| *Phoxinus erythrogaster* | Southern redbelly dace | D |
| *Platygobio gracilis* | Flathead chub | K |
| *Hybognathus placitus* | Plains minnow | K |
| *Catostomus discobulus* | Bluehead sucker | D |
| *Catostomus latipinnis* | Flannelmouth sucker | D |
| *Catostomus platyrynchus* | Mountain sucker | D |
| *Catostomus plebeius* | Rio Grande sucker | D |
| *Oncorhynchus clarki pleuriticus* | Colorado River cutthroat trout | D |
| *Oncorhynchus clarki bouvieri* | Yellowstone cutthroat trout | D |
| *Oncorhynchus clarki virginalis* | Rio Grande cutthroat trout | D |
| | | |
| **Invertebrates** | | |
| *Somatochlora hudsonica* | Hudsonian emerald butterfly | U |
| *Speyeria nokomis nokomis* | Great Basin silverspot butterfly | U |
| *Hesperia ottoe* | Ottoe skipper butterfly | U |
| *Speyeria idalia* | Regal fritillary | S |
| | | |
| **Reptiles and Amphibians** | | |
| *Rana pipiens* | Northern leopard frog | K |
| *Storeria occipitomaculata pahasapae* | Black Hills redbelly snake | S |
| | | |
| **Mammals** | | |
| *Euderma maculatum* | Spotted bat | K |
| *Corynorhinus townsendii* | Townsend's big-eared bat | K |
| *Myotis thysanodes* | Fringed myotis | K |
| *Cynomys ludovicianus* | Black-tailed prairie dog | K |
| *Vulpes velox* | Swift fox | K |
| | | |
| **Birds** | | |
| *Cygnus buccinator* | Trumpeter swan | U |
| *Botaurus lentiginosus* | American bittern | U |
| *Coccyzus americanus* | Yellow-billed cuckoo | K |
| *Numenius americanus* | Long-billed curlew | K |
| *Buteo regalis* | Ferruginous hawk | K |
| *Accipiter gentilis* | Northern goshawk | K |

| Table H-7. USFS Region 2 Sensitive Species List and Status for the Entire Thunder Basin National Grassland (Continued). | | |
|---|---|---|
| ***Scientific Name*** | **Common Name** | **Status on TBNG** |
| **Birds (continued)** | | |
| *Circus cyaneus* | Northern harrier | K |
| *Athene cunicularia* | Burrowing owl | K |
| *Asio flammeus* | Short-eared owl | K |
| *Calcarius ornatus* | Chestnut-collared longspur | K |
| *Calcarius mccownii* | McCown's longspur | K |
| *Centrocercus urophasianus* | Greater sage-grouse | K |
| *Haliaeetus leucocephalus* | Bald eagle | K |
| *Charadrius montanus* | Mountain plover | K |
| *Lanius ludovicianus* | Loggerhead shrike | K |
| *Spizella breweri* | Brewer's sparrow | K |
| *Ammodramus savannarum* | Grasshopper sparrow | K |
| *Amphispiza billneata* | Sage sparrow | U |
| *Chlidonias niger* | Black tern | K |
| *Melanerpes lewis* | Lewis' Woodpecker | K |

| Table H-8. USFS Region 2 Sensitive Species Status on TBNG and on USFS Lands Within the General Wright Analysis Area, and Habitat Suitability on USFS Lands Within the General Wright Analysis Area (Provided by USFS Douglas Ranger District, July 2007). | | |
|---|---|---|
| **Common Name (*Scientific Name*)** | **Status on TBNG/Status on USFS Lands in General Wright Analysis Area** | **Suitability of Habitat on USFS Lands in General Wright Analysis Area** |
| **Plants: Ferns and Allies** | | |
| Prairie moonwort (*Botrychium campestre*) | Undocumented/Undocumented | Very Poor to Unsuitable Habitat |
| Narrowleaf moonwort (*Botrychium lineare*) | Undocumented/Undocumented | Unsuitable Habitat |
| Leathery grapefern (*Botrychium multifidum* var. *coulteri*) | Undocumented/Undocumented | Unsuitable Habitat |
| | | |
| **Plants: Monocots** | | |
| Foxtail sedge (*Carex alopecoidea*) | Undocumented/Undocumented | Unsuitable Habitat |
| Elliptic spikerush (*Eleocharis elliptica*) | Undocumented/Undocumented | Unsuitable Habitat |

Table H-8. USFS Region 2 Sensitive Species Status on TBNG and on USFS Lands Within the General Wright Analysis Area, and Habitat Suitability on USFS Lands Within the General Wright Analysis Area (Provided by USFS Douglas Ranger District, July 2007) (Continued).

| **Common Name (*Scientific Name*)** | **Status on TBNG/Status on USFS Lands in General Wright Analysis Area** | **Suitability of Habitat on USFS Lands in General Wright Analysis Area** |
|---|---|---|
| **Plants: Monocots (Continued)** | | |
| Hall's fescue (*Festuca hallii*) | Undocumented/Undocumented | Unsuitable Habitat |
| Largeflower triteleia (*Triteleia grandiflora*) | Undocumented/Undocumented | Unsuitable Habitat |
| | | |
| **Plants: Dicots** | | |
| Barr's milkvetch (*Astragalus barrii*) | Documented/Undocumented | Suitable Habitat |
| Woolly twinpod (*Physaria didymocarpa* var. *lanata*) | Undocumented/Undocumented | Marginal Habitat |
| Visher's buckwheat (*Eriogonum visheri*) | Tentatively Documented/Undocumented | Unsuitable Habitat |
| Highbush-cranberry (*Viburnum opulus* var. *americanum*) | Undocumented/Undocumented | Unsuitable Habitat |
| | | |
| **Amphibians** | | |
| Northern leopard frog (*Rana pipiens*) | Documented/No Observations | Poor to Unsuitable Habitat |
| **Fish** | | |
| Flathead Chub (*Platygobio gracilis*) | Documented/Undocumented | Unsuitable Habitat |
| Plains minnow (*Hybognathus placitus*) | Documented/Undocumented | Unsuitable Habitat |
| **Mammals** | | |
| Black-tailed prairie dog (*Cynomys ludovicianus*) | Documented/Documented | Limited to Unsuitable Habitat |
| Swift fox (*Vulpes velox*) | Documented/No Observations | Suitable to Unsuitable Habitat |
| **Birds** | | |
| Long-billed curlew (*Numenius americanus*) | Documented/No Observations | Foraging Habitat |
| Ferruginous hawk (*Buteo regalis*) | Documented/Documented | Suitable Habitat |

Table H-8. USFS Region 2 Sensitive Species Status on TBNG and on USFS Lands Within the General Wright Analysis Area, and Habitat Suitability on USFS Lands Within the General Wright Analysis Area (Provided by USFS Douglas Ranger District, July 2007) (Continued).

| **Common Name (*Scientific Name*)** | **Status on TBNG/Status on USFS Lands in General Wright Analysis Area** | **Suitability of Habitat on USFS Lands in General Wright Analysis Area** |
|---|---|---|
| **Birds (Continued)** | | |
| Burrowing owl (*Athene cunicularia*) | Documented/Documented | Limited Suitable Habitat |
| Chestnut-collared longspur (*Calcarius ornatus*) | Documented/Documented | Limited Suitable Habitat |
| McCown's longspur (*Calcarius mccownii*) | Documented/Documented | Poor to Marginal Habitat |
| Greater sage-grouse (*Centrocercus urophasianus*) | Documented/Documented | Suitable to Unsuitable Habitat |
| Bald eagle (*Haliaeetus leucocephalus*) | Documented/Documented | Suitable Rangeland Foraging Habitat |
| Mountain Plover (*Charadrius montanus*) | Documented/No Observations | Suitable to Unsuitable Habitat |
| Loggerhead shrike (*Lanius ludovicianus*) | Documented/Documented | Marginal Habitat |
| Brewer's sparrow (*Spizella breweri*) | Documented/Documented | Suitable to Unsuitable Habitat |

Table H-9. USFS Region 2 Species of Local Concern Status on TBNG and on USFS Lands Within the General Wright Analysis Area, and Habitat Suitability on USFS Lands Within the General Wright Analysis Area (provided by Roche 2009).

| **Common Name (*Scientific Name*)** | **Status on TBNG/Status on USFS Lands in General Wright Analysis Area** | **Suitability of Habitat on USFS Lands in General Wright Analysis Area** |
|---|---|---|
| **Plants: Monocots** | | |
| Wood (wild) lily (*Lilium philadelphicum*) | Undocumented/Undocumented | Unsuitable Habitat |

Table H-9. USFS Region 2 Species of Local Concern Status on TBNG and on USFS Lands Within the General Wright Analysis Area, and Habitat Suitability on USFS Lands Within the General Wright Analysis Area (provided by Roche 2009) (Continued).

| **Common Name (*Scientific Name*)** | **Status on TBNG/Status on USFS Lands in General Wright Analysis Area** | **Suitability of Habitat on USFS Lands in General Wright Analysis Area** |
|---|---|---|
| **Plants: Dicots** | | |
| Smooth goosefoot (*Chenopodium subglabrum*) | Undocumented/Undocumented | Unsuitable Habitat |
| Flat-top (fragrant) goldentop (goldenrod) (*Euthamia graminifolia*) | Undocumented/Undocumented | Unsuitable Habitat |
| Rosy palafox (*Palafoxia rosea* var. *macrolepis*) | Documented/Undocumented | Suitable Habitat |
| Lemonscent (crown-seed fetid-marigold) (*Pectis angustifolia*) | Documented/Undocumented | Suitable Habitat |
| Larchleaf beardtongue (*Penstemon laricifolius* ssp. *exifolius*) | Undocumented/Undocumented | Marginal Habitat |

## H-3.2 Species Habitat and Occurrence on USFS Lands Within the General Wright Analysis Area, and the Direct and Indirect Direct Effects on Those Species

Site-specific data on the occurrence of USFS Region 2 Sensitive Species on USFS lands within the general Wright analysis area were obtained from the Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD) permit applications and annual reports for the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines, the Rocky Mountain Herbarium, the Wyoming Natural Diversity Database, and the USFS.

Baseline and annual wildlife surveys have been conducted for the three applicant mines (Black Thunder, Jacobs Ranch and North Antelope Rochelle) since the early 1980s. WDEQ/LQD guidelines and regulations specify different wildlife survey areas for different species and for different survey purposes (baseline studies or annual monitoring). Those surveys included the mine permit area and surrounding perimeter ranging from 0.5 to 2.0 miles (depending on the purpose of the surveys). The larger survey perimeters for the mines' annual monitoring programs coincidentally encompassed all USFS administered lands within the general analysis areas for the North and South Porcupine tracts and the North Hilight Field tract, all but the southwestern-

most corner (roughly 15 percent) of the general analysis area for the South Hilight Field tract, and all but the southwestern quarter (roughly 25 percent) of the general analysis area for West Hilight Field tract.

Regular surveys conducted in and near USFS lands over the years included raptors, mountain plovers (*Charadrius montanus*), upland game birds, migratory bird species of management concern, lagomorphs (rabbits), and big game. Supplemental specific surveys for bald eagles, herptiles, waterfowl, fish, and other species were conducted periodically during baseline studies for the applicant mines and adjacent mines (i.e., Antelope Mine). Efforts included a variety of approved survey methods, such as fixed-wing aerial, remote observation via spotting scopes and binoculars, pedestrian, nocturnal spotlighting, belt transects, point counts, and trapping. All incidental sightings of those species were also recorded during each site visit, including notes on species, number of individuals, sex/age (when possible), habitat, and location. Specific details regarding survey methods and results from annual monitoring and baseline inventories for the Black Thunder, Jacobs Ranch and North Antelope Rochelle mines, dating back to the early 1980s, are provided in reports on file with the WDEQ-LQD and/or USFS, and thus are not provided in this document.

USFS typically assesses impacts to resources on its managed lands and, when applicable, adjacent lands that could also be impacted by the Proposed Action. For wildlife, the USFS is interested in knowing what resources and potential impacts occur within a 1- or 2-mile perimeter surrounding their lands, depending on the species. As discussed in Section 3.10 of this EIS, the wildlife survey areas for this analysis includes the LBA tracts' general analysis areas plus a surrounding perimeter that varies in extent depending on the species. Thunder Basin Coal Company (TBCC) conducted baseline investigations during 2006 and early 2007 specifically for the West Hilight Field LBA Tract with additional surveys targeting the North and South Hilight Field LBA Tracts in 2007 and 2008; Jacobs Ranch Coal Company (JRCC) conducted baseline investigations in 2007 and 2008 expressly for the West Jacobs Ranch LBA Tract; and Powder River Coal, Inc. (PRC) conducted baseline investigations during 2007 and early 2008 specifically for the North and South Porcupine LBA Tracts. These surveys covered the respective general analysis areas, and surveys for selected wildlife information such as raptor nest, Greater sage-grouse lek, and prairie dog colony locations covered the respective wildlife survey areas (2-mile perimeter surrounding the general analysis areas). Figures H-1 through H-5 depict the wildlife survey area and the USFS lands within the general analysis area for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts, respectively.

The entire list of Region 2 Sensitive Species was reviewed and every vertebrate species was considered for full evaluation. However, only those species that might potentially be affected directly or indirectly by implementation of the

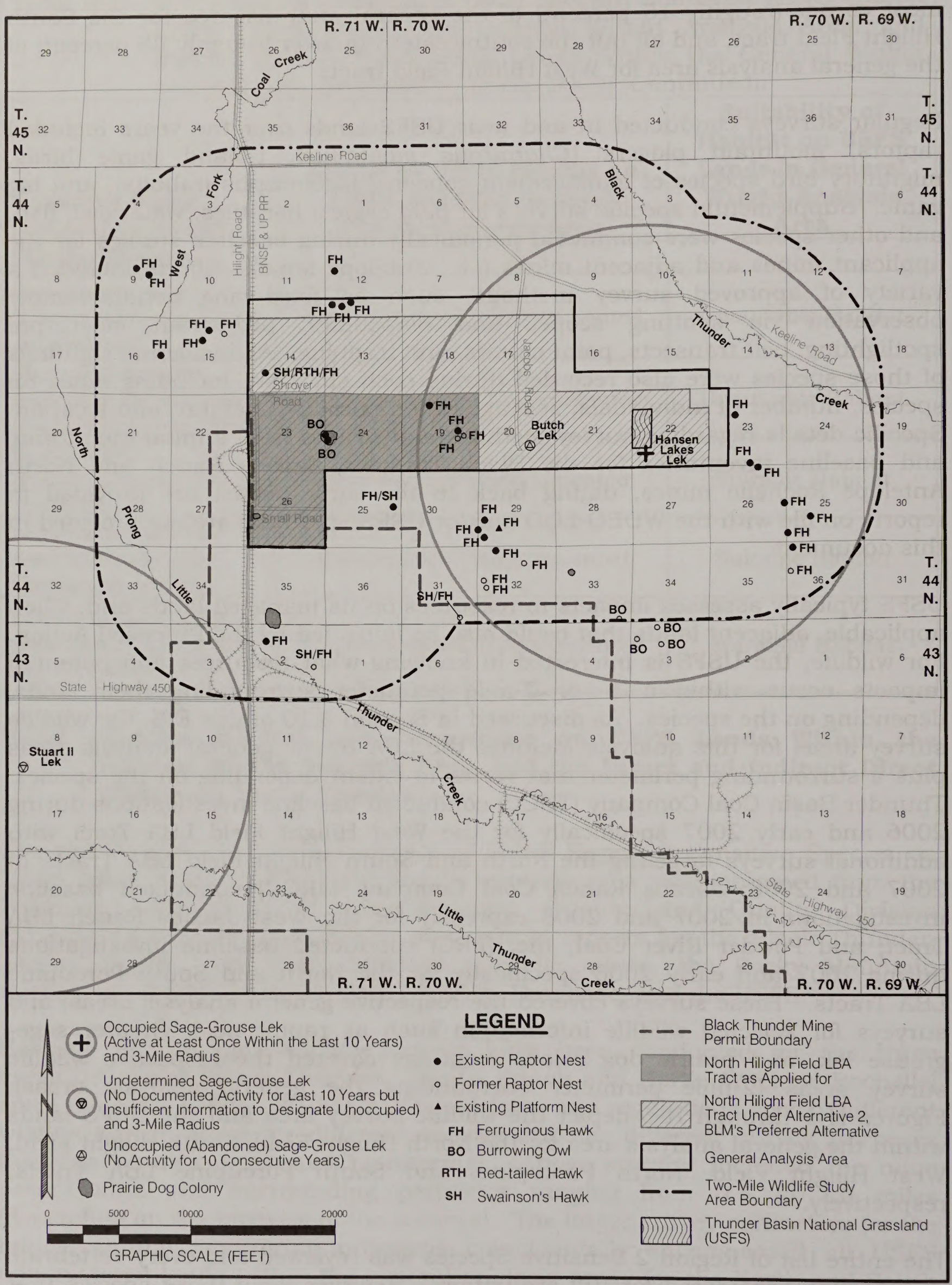


Figure H-1. USFS Region 2 Sensitive Wildlife Species Survey Area for the North Hilight Field LBA Tract.

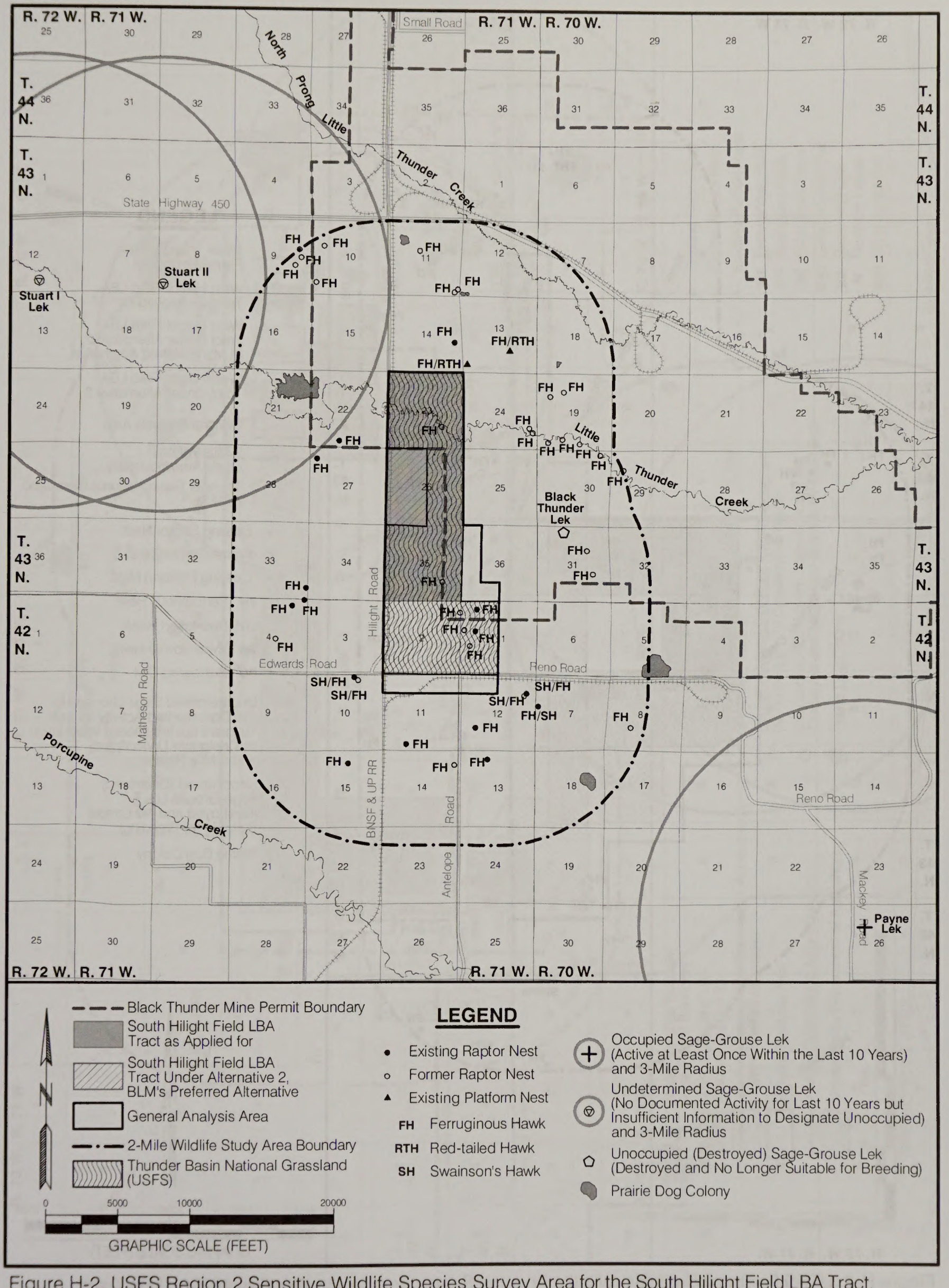


Figure H-2. USFS Region 2 Sensitive Wildlife Species Survey Area for the South Hilight Field LBA Tract.

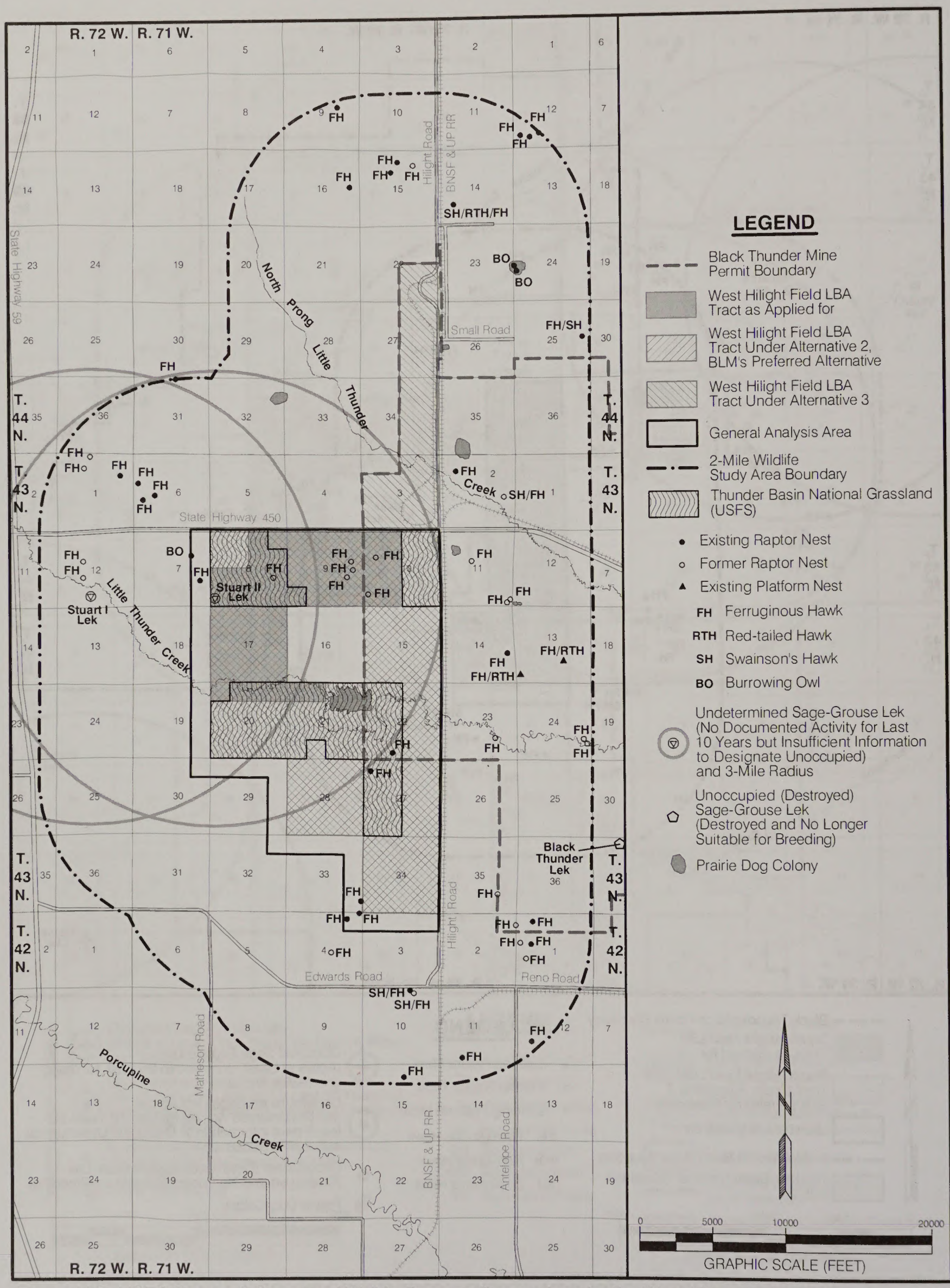


Figure H-3. USFS Region 2 Sensitive Wildlife Species Survey Area for the West Hilight Field LBA Tract.

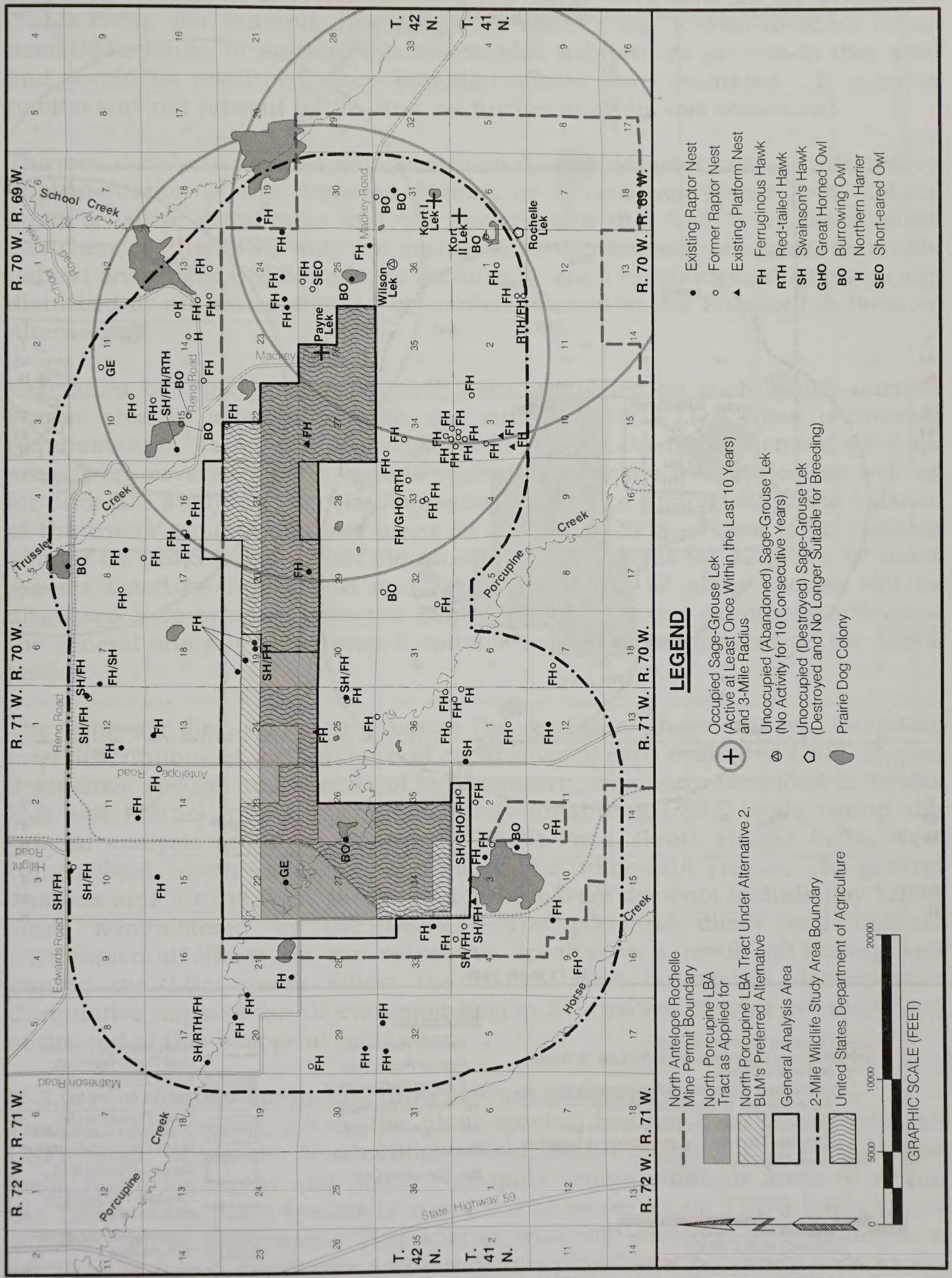


Figure H-4. USFS Region 2 Sensitive Wildlife Species Survey Area for the North Porcupine LBA Tract.

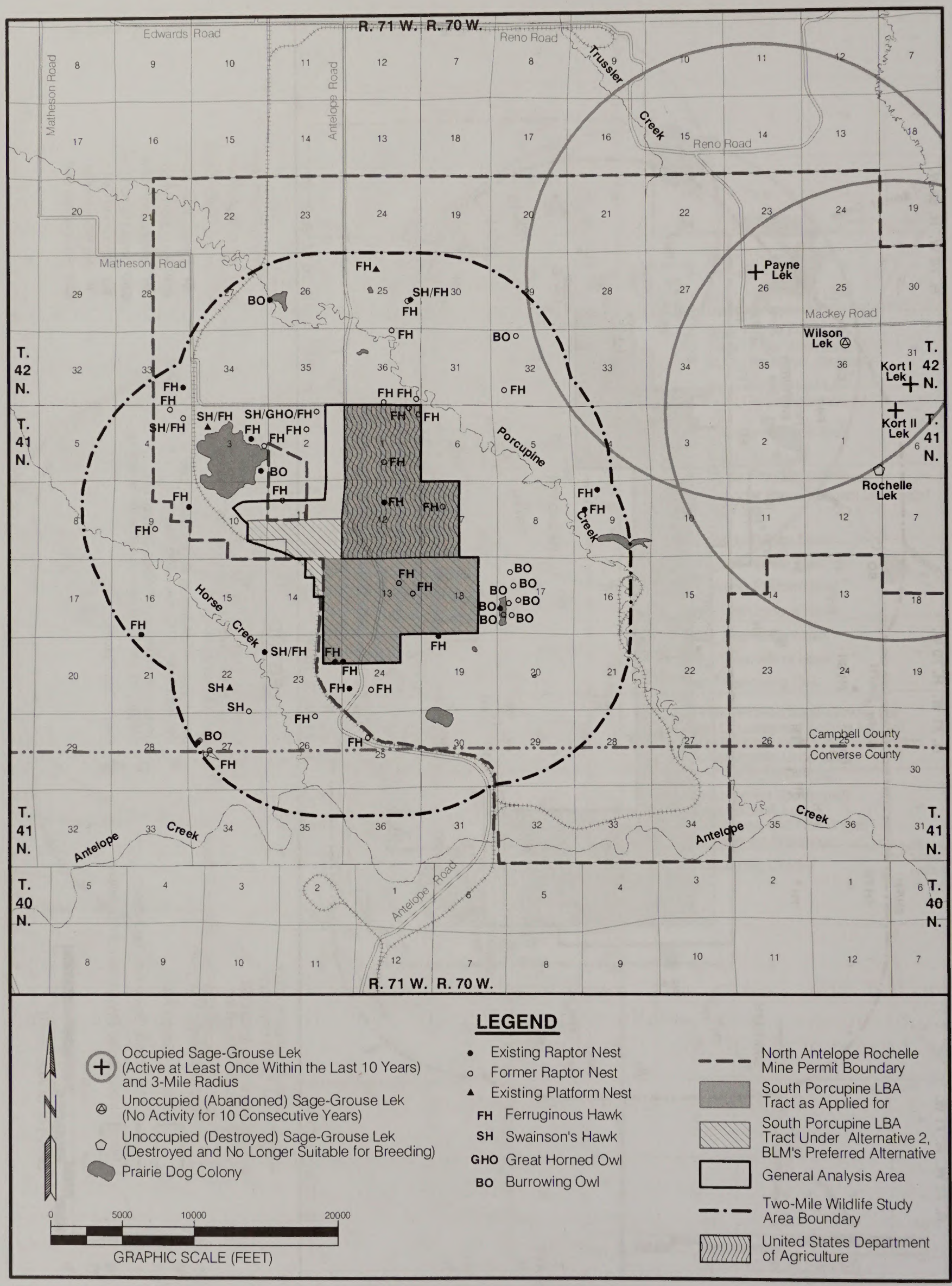


Figure H-5. USFS Region 2 Sensitive Wildlife Species Survey Area for the South Porcupine LBA Tract.

Proposed Actions or Alternatives on USFS lands were selected for evaluation (Table H-8). For example, if a vertebrate species was known to occur on or near USFS lands, or suitable but unoccupied habitat was present in that area and would be disturbed, then potential effects were evaluated. If suitable habitat was not present in the area, no further analysis was conducted.

Thirteen vertebrate species were identified that could potentially be affected by implementation of the Proposed Actions or Alternatives (Table H-8). Many other sensitive vertebrates and one invertebrate that had been documented elsewhere on the TBNG were not evaluated further because of a lack of suitable habitat on or near USFS lands, or because no such habitat would be physically disturbed or otherwise affected by implementation of the Proposed Actions or Alternatives.

Vegetation baseline inventories have been completed on each mine's current permit area in accordance with the current WDEQ/LQD mine permitting requirements. As a result, all or portions of the LBA tracts' general analysis areas were covered during various vegetation baseline inventories, as well as for prior EIS analyses. Vegetation assessments were completed for the balance of the tracts' general analysis areas in 2007 and 2008. There is no suitable habitat on USFS lands within the general analysis areas for 12 of the 17 plant species listed in Tables H-8 and H-9. All of the 17 plant species will be discussed here because potential habitat may be present on other portions of the general analysis areas even if suitable habitat is not present on the USFS lands.

The following discussions summarize the results of these surveys, including brief descriptions of the habitat and occurrence of each evaluated USFS Region 2 sensitive species and species of local concern, which are identified in Tables H-8 and H-9 as inhabiting or potentially inhabiting USFS lands within the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts. The general analysis area for the West Jacobs Ranch LBA Tract does not include any TBNG lands administered by the USFS. The potential direct and indirect environmental effects on the respective species as a result of leasing and mining the LBA tracts follow the habitat and occurrence descriptions. Cumulative impacts for all evaluated Region 2 Sensitive Species are discussed at the end of this biological evaluation.

### H-3.2.1 Prairie moonwort (*Botrychium campestre*)

The prairie moonwort, a sensitive plant species, has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species was only recorded in Wyoming in a semi-shady mixed deciduous and ponderosa pine forest on sandy soils in the Black Hills. Prairie moonworts are known to exist in a variety of other habitats such as those underlain by Pierre shale, the Laramie Formation, calcareous

sedimentary rocks, calcareous soils underlain by limestone, sandy soils and loess prairie. These habitats are generally limited on the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas, with only some areas dominated by sandy soils present.

Existing Conditions

Prime habitats for the prairie moonwort are not present on the USFS lands within the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts. Sites with sandy soils are present on USFS lands and other portions of the general Wright analysis area, but these areas are rather sparsely vegetated and do not provide habitat preferred by this plant species. Prairie moonworts have not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species. The potential for loss of individuals or preferred habitats is very low.

### H-3.2.2 Narrowleaf moonwort (*Botrychium lineare*)

The narrowleaf moonwort, a sensitive plant species, has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species has an affinity for riparian areas and is associated with spruce/fir forests, lodgepole pine forests, and forest meadows.

Existing Conditions

Habitats for the narrowleaf moonwort are not present on the USFS lands within the general Wright analysis area. Suitable riparian habitats or forest habitats are not present on these USFS lands within the general Wright analysis area. Few riparian sites associated with various ephemeral drainages are present on portions of the general Wright analysis area, and these sites do not appear to provide optimum habitat for this species. The narrowleaf moonwort has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts
If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale
Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species. The potential loss of individuals or preferred habitats is very low.

### H-3.2.3 Leathery grapefern (*Botrychium multifidum* var. *coulteri*)

The leathery grapefern, a plant species of local concern, has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for meadows, wetlands, floodplains and other wet areas in open to forested habitats within forests.

Existing Conditions
Habitats for the leathery grapefern are not present on the USFS lands within the general Wright analysis area. Suitable riparian habitats or forest habitats are not present on these USFS lands within the general Wright analysis area. Few riparian sites associated with various ephemeral drainages are present on other portions of the general Wright analysis area, and these sites do not appear to provide optimum habitat for this species. The leathery grapefern has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts
If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale
Implementation of the Proposed Action or Alternative 2 for each LBA tract *would have no impact* on the leathery grapefern. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species so the potential loss of individuals or preferred habitats is not expected.

### H-3.2.4 Foxtail sedge (*Carex alopecoidea*)

The foxtail sedge, a sensitive plant species, is a perennial plant species and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general

analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. The foxtail sedge generally has an affinity for wet meadows and willow-sedge communities along wet, shady creek bottoms and springs.

Existing Conditions

Habitats for the foxtail sedge are not present on the USFS lands within the general Wright analysis area. Suitable wet meadows or willow-sedge communities are not present on these USFS lands. Few riparian sites associated with various ephemeral drainages are present on other portions of the general Wright analysis area, and these sites do not appear to provide optimum habitat for this species. The foxtail sedge has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *should have no impact* on the foxtail sedge. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species. The potential for loss of individuals or preferred habitats is not expected.

### H-3.2.5 Elliptic spikerush (*Eleocharis elliptica*)

The elliptic spikerush, a sensitive plant species, is a perennial and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for wetland areas created by seeps or springs but may also be found in temporarily flooded areas.

Existing Conditions

Habitats for the elliptic spikerush are not present on the USFS lands within the general Wright analysis area. Suitable wetland habitats are not present on these USFS lands. Few wetland sites associated with various ephemeral drainages and playas are present on portions of the general Wright analysis area, but these sites do not appear to provide optimum habitat for this species. The elliptic spikerush has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining

activities. However, due to lack of abundant suitable habitat the impacts to this species overall would be minimal.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide abundant habitat for this plant species so the potential loss of individuals or preferred habitats is low.

### H-3.2.6 Hall's fescue (*Festuca hallii*)

The Hall's fescue, a sensitive plant species, is a tufted perennial grass and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for montane meadows, slopes and edges of open coniferous woods and meadows above 6,000 feet in Wyoming.

Existing Conditions

Habitats for the Hall's fescue are not present on the USFS lands within the general Wright analysis area. Suitable montane habitats above 6,000 feet are not present on these USFS lands within the general Wright analysis area, and the Hall's fescue has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *should have no impact* on the Hall's fescue. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species. The potential loss of individuals or preferred habitats is not expected.

### H-3.2.7 Wood lily (*Lilium philadelphicum*)

The wood lily, a plant species of local concern, is a perennial herb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for woodland meadows and woodland grasslands.

Existing Conditions
Habitats for the wood lily are not present on the USFS lands within the general Wright analysis area. Suitable woodland meadow or grassland habitats are not present on these USFS lands within the general Wright analysis area, and the wood lily has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts
If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale
Implementation of the Proposed Action or Alternative 2 for each LBA tract *should have no impact* on the wood lily. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species so the potential loss of individuals or preferred habitats is not expected.

### H-3.2.8 Largeflower triteleia (*Triteleia grandiflora*)

The largeflower triteleia, a sensitive plant species, is a perennial herb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for grassy areas in sagebrush at the edge of aspen and lodgepole pine forests and in pinon-juniper woodlands to pine forests and hills.

Existing Conditions
Habitats for the largeflower triteleia are not present on the USFS lands within the general Wright analysis area. Suitable grassy areas in sagebrush at the edge of aspen and lodgepole pine forests and pinon-juniper woodlands or pine forests and hills are not present on these USFS lands within the general Wright analysis area, and the largeflower triteleia has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts
If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale
Implementation of the Proposed Action or Alternative 2 for each LBA tract *should have no impact* on the largeflower triteleia. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable

habitat for this plant species so the potential loss of individuals or preferred habitats is not expected.

### H-3.2.9 Barr's milkvetch (*Astragalus barrii*)

The Barr's milkvetch, a sensitive plant species, is a matt-forming perennial forb that is known from numerous occurrences on the USFS lands within the TBNG. As more surveys are completed, new occurrences are reported. The Barr's milkvetch is found primarily on dry, sparsely-vegetated rocky prairie breaks, knolls, hillsides and ridges. Parent material is calcareous soft shale, siltstone or silty sandstone. Most populations appear to be stable, although populations may decline under drought conditions.

Existing Conditions

*Astragalus barrii* is a regional endemic plant of the plains in southwestern South Dakota, eastern Wyoming, southeastern Montana, and northwestern Nebraska. According to USFS, this plant species is known to occur in six counties in Wyoming, and there are eleven known occurrences of *A. barrii* in the USFS TBNG.

Suitable habitat for the Barr's milkvetch is present on the USFS lands within the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine LBA Tracts as well as other lands within the general Wright analysis area. Populations and individuals have not been documented in the general analysis areas for the North, South and West Hilight Field tracts, but have been identified in surrounding areas. A pedestrian survey of the North, South and West Hilight Field tracts' general analysis areas was conducted in April 2008, when the Barr's milkvetch is in bloom, and no individuals of this species were found. Surveys in 2005 within the general analysis areas for the North and South Porcupine tracts identified Barr's milkvetch populations, but no individuals were found on USFS lands. Barr's milkvetch has been collected and positively identified approximately 6 miles south of the general Wright analysis area, in Section 21 of T.40N., R.71W., based on specimens on file with the Rocky Mountain Herbarium in Laramie, Wyoming.

Indirect and Direct Impacts

If lands within the general analysis areas for the North Hilight Field, South Hilight Field and West Hilight Field LBA Tracts are leased and mined, potential habitat, individuals, and *A. barrii* populations could be lost due to surface disturbances caused by mining activities. If lands within the general analysis areas for the North Porcupine and South Porcupine LBA Tracts are leased and mined, potential habitat, individuals, and *A. barrii* populations would be lost due to surface disturbances caused by mining activities. These losses would most likely be permanent unless disturbed lands are reclaimed to habitats that would support this plant species.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing* because there are *Astragalus barrii* occurrences outside of the areas that would be affected by the Proposed Action or Alternative 2. The Rocky Mountain Herbarium records reveal this plant species is widespread in northeastern Wyoming, so the loss of individuals or populations from mining activities related to the Proposed Action or Alternative 2 would not result in the extirpation of this species.

### H-3.2.10 Smooth goosefoot (*Chenopodium subglabrum*)

The smooth goosefoot, a plant species of local concern, is an annual forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for sand bars and sandy blowouts in riparian areas.

Existing Conditions

Habitats for the smooth goosefoot are not present on the USFS lands within the general Wright analysis area. Suitable riparian areas are not present on the USFS lands within the general Wright analysis area. A few riparian areas associated with various ephemeral drainages are present on portions of the general Wright analysis area, but these areas do not contain the required sand bar or sandy blowout habitats required for this plant species. The smooth goosefoot has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *should have no impact* on the smooth goosefoot. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species so the potential loss of individuals or preferred habitats is not expected.

### H-3.2.11 Flat-top goldentop (*Euthamia graminifolia*)

The flat-top goldentop, a plant species of local concern, is a rhizomatous perennial forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. In Wyoming, this species generally has an affinity for stony sandbars and

streambanks but may also be found on moist or drying sites along open streambanks or roadside ditches.

Existing Conditions

Habitats for the flat-top goldentop are not present on the USFS lands within the general Wright analysis area. Suitable wetland or streambank areas are not present on the USFS lands within the general Wright analysis area. Streambanks and a few wetland areas in association with various ephemeral drainages are present within portions of the general Wright analysis area, but these areas generally do not contain the typical habitats required for this plant species, but marginal habitats are present. The flat-top goldentop has not been recorded on the general Wright analysis areas or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species so the potential loss of individuals or preferred habitats is low.

### H-3.2.12 Rosy palafox (*Palafoxia rosea* var. *macrolepis*)

The rosy palafox, a plant species of local concern, is an annual forb that has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas but has been recorded on other lands within the TBNG. This plant species is suspected of occurring on other TBNG lands where suitable habitat is present. In Wyoming, this species generally has an affinity for sagebrush and mixed-grass prairie habitats on sandy soils.

Existing Conditions

Habitats utilized by the rosy palafox are present on the USFS lands within the general Wright analysis area and on other surrounding lands. Sagebrush and mixed-grass prairie plant communities are present on sandy soils in the general Wright analysis area. However, rosy palafox has not been recorded on these lands but is potentially present. This plant species has been documented southeast of the general Wright analysis area.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities. However, due to the presence of abundant habitat outside of the general analysis areas for the North Hilight Field, South Hilight Field, West

Hilight Field, North Porcupine and South Porcupine tracts, and the fact that this plant is abundant in other areas, the impacts to this species overall would be minimal.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do contain some suitable habitat for this plant species but the rosy palafox has not been documented. This species has been documented southeast of the general Wright analysis area and abundant habitat is present on other sites that would not be affected.

### H-3.2.13 Lemonscent (*Pectis angustifolia*)

The lemonscent, a plant species of local concern, is an annual forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas but has been recorded on other lands within the TBNG. This plant species is suspected of occurring on other TBNG lands where suitable habitat is present. In Wyoming, this species generally has an affinity for gravel hills and scoria slopes. Lemonscent is also known to occur in low areas in sandy ravines and on sandbars.

Existing Conditions

Habitats utilized by lemonscent are present on the USFS lands within the general Wright analysis area and on other surrounding lands. However, lemonscent has not been recorded in the general Wright analysis area but could potentially be present. This plant species has been documented south of the general Wright analysis area.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities. However, due to the presence of abundant habitat outside of the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts, and the fact that this plant is abundant in other areas, the impacts to this species overall would be minimal.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do contain some suitable habitat for this plant species but the lemonscent has not been documented. This species has been documented south of the general Wright analysis area and abundant habitat is

present on other sites outside of the areas that would be affected by the Proposed Action or Alternative 2 for each LBA tract.

### H-3.2.14 Larchleaf beardtongue (*Penstemon laricifolius* spp. *exifolius*)

The larchleaf beardtongue (penstemon), a plant species of local concern, is a perennial forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. In Wyoming, this species generally has an affinity for dry, rocky, gravelly or sandy slopes, ridgetops and upland flats with shallow soils. Most populations in Wyoming are found at elevations above 6,000 feet, but this species has been documented at lower elevations in the state.

Existing Conditions

Habitats utilized by larchleaf beardtongue are marginally present on the USFS lands within the general Wright analysis area. A few rocky, gravelly hill slopes and rough breaks provide potential habitat, but the larchleaf beardtongue has not been recorded on these lands. This plant species has not been documented near the general Wright analysis area but is potentially present.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities. However, due to the presence of abundant habitat outside of the general Wright analysis area and the fact that this plant is abundant in other areas, the impacts to this species overall would be minimal.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do contain marginal habitat for this plant species but the larchleaf beardtongue has not been documented. This species has been documented and is common in southern Wyoming and abundant habitat is present on other sites outside of the areas that would be affected by the Proposed Action or Alternative 2 for each LBA tract.

### H-3.2.15 Wooly twinpod (*Physaria didymocarpa* var. *lanata*)

The wooly twinpod, a sensitive plant species, is a perennial forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. This plant species is suspected of occurring on other TBNG lands where suitable habitat is present. In Wyoming, this species generally has an affinity for dry redbed clay-shale slopes, limey-sandstone outcrops, roadcuts and other exposed rock-cliff substrates. Most

populations in Wyoming have been documented in the foothills of the Big Horn Mountains.

Existing Conditions

Habitats utilized by the wooly twinpod are marginally present on the USFS lands within the general Wright analysis area. A few sandstone outcrops and exposed rock-cliff substrates provide potential habitat, but the wooly twinpod has not been recorded on these lands. This plant species has not been documented near the general Wright analysis area but is potentially present.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities. However, due to the presence of abundant habitat outside of the general Wright analysis area and the fact that this plant is abundant in other areas, the impacts to this species overall would be minimal.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do contain marginal habitat for this plant species but the wooly twinpod has not been documented. This species has been documented and is common in north-central Wyoming and abundant habitat is present on other sites outside of the areas that would be affected by the Proposed Action or Alternative 2 for each LBA tract.

### H-3.2.16 Visher's buckwheat (*Eriogonum visheri*)

The Visher's buckwheat, a sensitive plant species, is an annual forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas but has been tentatively identified elsewhere within the TBNG. This plant species is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for gullied ridges and eroded badland hills. These sites generally consist of barren shale and clay outcrops with at least 50 percent bare soil, high salt content and shrink/swell clay soils. Typical habitat includes badland islands in grasslands.

Existing Conditions

Habitats for the Visher's buckwheat are not present on the USFS lands within the general Wright analysis area. A few areas of highly eroded gullies consisting of barren shale or clay outcrops may be found in portions of the general Wright analysis area, but these sites generally provided a greater vegetation cover than is needed to provide optimum habitat for this species. The Visher's buckwheat has not been recorded on the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *would have no impact* on the Visher's buckwheat. As indicated, the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide optimum suitable habitat for this plant species so the potential loss of individuals or preferred habitats is not expected.

### H-3.2.17 Highbush-cranberry (*Viburnum opulus* var. *americanum*)

The highbush-cranberry, a sensitive plant species, is a perennial forb and has not been documented on USFS lands within the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine general analysis areas or within the TBNG. In Wyoming, this plant species is found within Crook County and is suspected of occurring on TBNG lands where suitable habitat is present. This species generally has an affinity for moist sites including wooded hillsides, thickets or low woodlands. The highbush-cranberry is found all across northern North America.

Existing Conditions

Habitats for the highbush-cranberry are not present on the USFS lands within the general Wright analysis area. Suitable moist, wooded habitats are not present on these USFS lands within the general Wright analysis area. The highbush-cranberry has not been recorded within the general Wright analysis area or adjacent areas.

Indirect and Direct Impacts

If present on areas to be disturbed by mining, individuals of this species would be lost when topsoil is removed or during disturbances caused by other mining activities.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *would have no impact* on the highbush-cranberry. As indicated, this species has not been documented in the general Wright analysis area and the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts do not provide suitable habitat for this plant species so the potential loss of individuals or preferred habitats is not expected.

### H-3.2.18 Northern leopard frog (*Rana pipiens*)

Northern leopard frogs range from the Great Slave Lake and Hudson Bay, south to Kentucky and New Mexico (NatureServe 2007). This species is considered relatively common within Wyoming (Baxter and Stone 1980,

Cerovski et al. 2004). Northern leopard frogs require shallow, permanent, or semi-permanent standing water with at least some emergent vegetation for breeding (Wagner 1997). Conversely, they use deeper lakes or ponds with well-oxygenated water that does not freeze to the bottom as overwintering habitat (Wagner 1997). Leopard frogs must have good quality water to successfully reproduce, as degraded or turbid water has the potential to negatively affect development of eggs and tadpoles. Overcrowding and changes in water temperature and pH (5.5 or lower) can increase the incidence of disease and mortality (NatureServe 2007) in this species. Adult frogs feed upon a variety of insects and other invertebrates, tadpoles, snakes, and fish (Cerovski et al. 2004), while tadpoles feed primarily upon small invertebrates, plant tissue, and organic debris. Adults also forage within aquatic and upland habitats, whereas tadpoles are restricted to aquatic habitats. Although their overall range remains essentially undiminished in size, many populations are declining. Major factors affecting leopard frog populations are habitat loss in some portions of their range, habitat degradation, overexploitation, interactions with non-native species, climate change, disease, and other unknown causes (Wagner 1997).

Existing Conditions – North Hilight Field LBA Tract

The northern leopard frog has been observed in southern Campbell County, but has not officially been recognized as breeding there (Cerovski et al. 2004). Although formal anuran surveys were not required or conducted at the adjacent Black Thunder, Jacobs Ranch, or North Antelope Rochelle mines, annual monitoring efforts for other species conducted in overlapping survey areas from 1983 through 2007 have not revealed the presence of northern leopard frogs or anuran egg masses on USFS lands or elsewhere within the general analysis area for the North Hilight Field LBA Tract. Those surveys occurred during all seasons, with biologists watching and listening for northern leopard frogs and other herptiles while conducting all other surveys throughout the area. It is unlikely that northern leopard frogs would have remained undetected during multiple surveys conducted during that long-term period if they were present in the area. Results from annual wildlife monitoring and baseline studies for the three mines are on file with, and available from, the WDEQ/LQD in Sheridan or Cheyenne, Wyoming and USFS Douglas Ranger District; those reports also include detailed descriptions of survey areas (including maps), methods, and dates for each year.

Habitat conditions on USFS and non-USFS lands within the tract's general analysis area are classified as unsuitable, as there are no available permanent or semi-permanent water sources. Water levels in drainages are typically too temporary and/or shallow to support tadpoles until metamorphosis, or allow frogs to successfully overwinter, respectively. All drainages throughout the tract's general analysis area are ephemeral in nature and only carry water during or immediately following high intensity precipitation events, resulting in low quality or unsuitable habitat conditions for this frog species. The general

lack of emergent vegetation near temporary water bodies limits their value to northern leopard frogs.

Existing Conditions – South Hilight Field LBA Tract

The northern leopard frog has been observed in southern Campbell County, but has not officially been recognized as breeding there (Cerovski et al. 2004). Although formal anuran surveys were not required or conducted at the adjacent Black Thunder, Jacobs Ranch, or North Antelope Rochelle mines, annual monitoring efforts for other species conducted in overlapping survey areas from 1983 through 2007 have not revealed the presence of northern leopard frogs or anuran egg masses on USFS lands or elsewhere within the general analysis area for the South Hilight Field LBA Tract. Those surveys occurred during all seasons, with biologists watching and listening for northern leopard frogs and other herptiles while conducting all other surveys throughout the area. It is unlikely that northern leopard frogs would have remained undetected during multiple surveys conducted during that long-term period if they were present in the area. Results from annual wildlife monitoring and baseline studies for the three mines are on file with, and available from, the WDEQ/LQD in Sheridan or Cheyenne, Wyoming and USFS Douglas Ranger District; those reports also include detailed descriptions of survey areas (including maps), methods, and dates for each year.

Habitat conditions on USFS and non-USFS lands within the tract's general analysis area are classified as poor potential to unsuitable, as there are only limited seasonal water sources available. No permanent or semi-permanent waters are present anywhere on those USFS lands. Little Thunder Creek passes through USFS lands within the South Hilight Field tract. In its natural state, this ephemeral stream is typically dry by mid to late summer, and without flow to maintain open water, any pools persisting until winter freeze solid, thus limiting overwintering habitat for this species. Like Little Thunder Creek, all other drainages throughout the tract's general analysis area are ephemeral in nature and only carry water during or immediately following high intensity precipitation events, resulting in low quality or unsuitable habitat conditions for this frog species. Water discharged from CBNG wells has enhanced the water supply within some portions of Little Thunder Creek and its tributaries, which has increased potential habitat for some aquatic and semi-aquatic species. However, those enhanced areas are still relatively limited and/or isolated in nature. Water levels in drainages are typically too temporary and/or shallow to support tadpoles until metamorphosis, or allow frogs to successfully overwinter, respectively. The general lack of emergent vegetation near temporary water bodies limits their value to northern leopard frogs.

Existing Conditions – West Hilight Field LBA Tract

The northern leopard frog has been observed in southern Campbell County, but has not officially been recognized as breeding there (Cerovski et al. 2004). Although formal anuran surveys were not required or conducted at the

adjacent Black Thunder, Jacobs Ranch, or North Antelope Rochelle mines, annual monitoring efforts for other species conducted in overlapping survey areas from 1983 through 2007 have not revealed the presence of northern leopard frogs or anuran egg masses on USFS lands or elsewhere within the general analysis area for the West Hilight Field LBA Tract. Those surveys occurred during all seasons, with biologists watching and listening for northern leopard frogs and other herptiles while conducting all other surveys throughout the area. It is unlikely that northern leopard frogs would have remained undetected during multiple surveys conducted during that long-term period if they were present in the area. Results from annual wildlife monitoring and baseline studies for the three mines are on file with, and available from, the WDEQ/LQD in Sheridan or Cheyenne, Wyoming and USFS Douglas Ranger District; those reports also include detailed descriptions of survey areas (including maps), methods, and dates for each year.

Habitat conditions on USFS and non-USFS lands within the tract's general analysis area are classified as poor potential to unsuitable, as there are only limited seasonal water sources available. No permanent or semi-permanent waters are present anywhere on those USFS lands. Little Thunder Creek passes through USFS lands within the West Hilight Field tract. In its natural state, this ephemeral stream is typically dry by mid to late summer, and without flow to maintain open water, any pools persisting until winter freeze solid, thus limiting overwintering habitat for this species. Like Little Thunder Creek, all other drainages throughout the tract's general analysis area are ephemeral in nature and only carry water during or immediately following high intensity precipitation events, resulting in low quality or unsuitable habitat conditions for this frog species. Water discharged from CBNG wells has enhanced the water supply within some portions of Little Thunder Creek and its tributaries, which has increased potential habitat for some aquatic and semi-aquatic species. However, those enhanced areas are still relatively limited and/or isolated in nature. A portion of Little Thunder Creek on USFS lands in the W½ Section 22, T.43N., R.71W. (Little Thunder Reservoir) has been dammed to retain water for at least part of each year. Despite that occasional increased water supply, the reservoir often lacks the emergent vegetation that is important for breeding and foraging leopard frogs. Water levels in drainages are typically too temporary and/or shallow to support tadpoles until metamorphosis, or allow frogs to successfully overwinter, respectively. The general lack of emergent vegetation near temporary water bodies limits their value to northern leopard frogs.

Existing Conditions – North Porcupine LBA Tract

The northern leopard frog has been observed in southern Campbell County, but has not officially been recognized as breeding there (Cerovski et al. 2004). No suitable habitat is present on USFS lands within the general analysis area for the North Porcupine LBA Tract. Porcupine Creek crosses a narrow band (approximately 1,500 feet) of USFS lands in the western portion of the tract's general analysis area (Figure H-4), but that small portion of the creek does not

provide sufficient, persistent water quantities or quality to support northern leopard frogs; the same is true of the stream channel immediately upstream and downstream of USFS lands in that area. No other persistently flowing streams or persistent reservoirs are present on USFS lands within the North Porcupine tract's general analysis area.

Habitat conditions for northern leopard frogs vary considerably between the overall general analysis area for the North Porcupine LBA Tract and the USFS lands within that larger area. The tract's general analysis area includes portions of Porcupine Creek and some of its ephemeral tributaries that occasionally retain small pools of water during spring and early summer. Within the general analysis area for the North Porcupine LBA Tract there are an estimated 19.7 acres of jurisdictional wetlands and other waters of the U.S. (OWUS). Of those 25.8 acres, there are approximately 9.3 acres of riverine wetlands, approximately 0.9 acres of stockpond wetlands, approximately 0.9 acres of stockpond open water OWUS, and approximately 8.6 acres of ephemeral stream channel OWUS. There are also approximately 4.9 wetland acres and 1.2 open water acres of non-jurisdictional playa/depressional features. The vegetated wetland areas consist primarily of palustrine emergent herbaceous wet meadow or marsh and palustrine aquatic beds located along ephemeral stream channels and around in-channel stock reservoirs. Without surface discharge of groundwater associated with CBNG development in the area, no water would be present in these ephemeral streams except in response to precipitation events and snow melt. Flows to maintain open water are therefore inconsistent and these streams are often dry by mid- to late summer; without flow to maintain open water, any pools persisting until winter freeze solid, which limits overwintering habitat for this species. Therefore, none of the physical characteristics considered as optimum for the various life stages of this species are present on the USFS lands throughout this tract's general analysis area, and no leopard frogs or anuran egg masses have been documented on those lands during more than 25 years of annual monitoring efforts. No northern leopard frogs were ever recorded in the general analysis area during overlapping annual monitoring efforts for other species conducted from 1984 through 2007. Results from annual wildlife monitoring and baseline studies for all adjacent mines are on file with, and available from, the WDEQ/LQD in Sheridan or Cheyenne, Wyoming and the USFS Douglas Ranger District Office in Douglas, Wyoming. Those reports also include detailed descriptions of survey areas (including maps), methods, and dates for each year.

Existing Conditions – South Porcupine LBA Tract

The northern leopard frog has been observed in southern Campbell County, but has not officially been recognized as breeding there (Cerovski et al. 2004). No suitable habitat is present on USFS lands within the general analysis area for the South Porcupine LBA Tract. Prior to CBNG development in this area, no persistent standing water was present within the South Porcupine tract's general analysis area, including all USFS surface lands in that area (Figure H-

5). Water sources on those lands are limited to an ephemeral tributary of Porcupine Creek (Mike's Draw), which flows in response to precipitation events such as rain storms and excessive snow melt. However, surface discharge of groundwater associated with CBNG development within the tract's general analysis area, which is a relatively recent phenomenon, has resulted in generally wetter conditions within the stream's channel throughout the year. Within the tract's entire general analysis area, there are an estimated 12.3 acres of jurisdictional wetlands and other waters of the U.S. (OWUS). Of those 12.3 acres, there are approximately 6.8 acres of riverine wetlands, approximately 0.4 acres of stockpond wetlands, approximately 0.2 acres of stockpond open water OWUS, and approximately 4.9 acres of ephemeral stream channel OWUS, all of which are present along Mike's Draw.. The vegetated wetland areas consist primarily of palustrine emergent herbaceous wet meadow or marsh along the ephemeral stream channel. Without surface discharge of groundwater associated with CBNG development in the area, no water would be present in Mike's Draw except in response to precipitation events and snow melt. Flows to maintain open water are therefore considered inconsistent, which limits overwintering habitat for this species. Therefore, none of the physical characteristics considered as optimum for the various life stages of this species are present on the USFS lands throughout this tract's general analysis area, and no leopard frogs or anuran egg masses have been documented on those lands during more than 25 years of annual monitoring efforts. No northern leopard frogs were ever recorded in the general analysis area during overlapping annual monitoring efforts for other species conducted from 1984 through 2007. Results from annual wildlife monitoring and baseline studies for all adjacent mines are on file with, and available from, the WDEQ/LQD in Sheridan or Cheyenne, Wyoming and the USFS Douglas Ranger District Office in Douglas, Wyoming. Those reports also include detailed descriptions of survey areas (including maps), methods, and dates for each year.

Direct and Indirect Effects – North, South and West Hilight Field LBA Tracts

Wetland and aquatic habitats for northern leopard frogs are considered very poor to unsuitable on USFS lands and elsewhere in the general analysis areas for the North Hilight Field, South Hilight Field and West Hilight Field LBA Tracts, as described above. Furthermore, no frog sightings have been recorded on USFS lands during baseline surveys or annual monitoring completed between 1983 and 2007. Consequently, northern leopard frogs and their aquatic and terrestrial habitats are not expected to be impacted if the USFS lands in these LBA tracts were leased. In the unlikely event that this species is present in the future, direct loss of, or injury to, foraging and dispersing frogs could result from encounters with mine vehicles or heavy equipment during topsoil stripping or other surface disturbance, although such risks are minimal due to the lack of frog sightings to date.

It is possible that existing reservoirs and ponds (natural and those enhanced by CBNG discharge water), and those created for flood control, sedimentation,

water storage purposes, or wetland mitigation measures could provide suitable foraging or breeding habitat for northern leopard frogs in the future. However, most artificial water structures would still be limited to relatively shallow, seasonal waters with little emergent vegetation that would not provide for the year-round habitat needs of this frog species. Should those efforts result in improved aquatic habitats, adult frogs, tadpoles, and/or egg masses present in the area could be injured or killed during activities associated with additional construction of diversion dikes or associated channels, or the dewatering of potential habitats downstream of a dike. Under those limited circumstances, potential impacts could include loss of individuals and foraging habitat, increased predation, and changes in stream morphology and hydrology. Standard mining procedures such as the use of silt barriers across affected stream channels and other similar efforts would minimize any negative impacts that might result from mine-related operations. Likewise, adherence to the Thunder Basin National Grassland Plan Standards and Guidelines (USFS 2002) pertaining to water and wetlands would ensure that leopard frogs and other aquatic organisms present on USFS lands would not be negatively affected by increased sedimentation, degraded water chemistry, or otherwise damaged aquatic habitats.

Direct and Indirect Effects – North and South Porcupine LBA Tracts

Wetland and aquatic habitats for northern leopard frogs are considered unsuitable to poor on USFS lands and elsewhere in the North and South Porcupine tracts' general analysis areas, as described above. Furthermore, no frog sightings have been recorded on USFS lands during baseline surveys or annual monitoring completed between 1984 and 2007. Consequently, northern leopard frogs and their aquatic and terrestrial habitats are not expected to be impacted if the USFS lands in the North and South Porcupine LBA Tracts are leased and mined.

In the unlikely event that this species is present in the North and South Porcupine tracts' general analysis areas in the future, direct loss of, or injury to, foraging and dispersing frogs could result from encounters with mine vehicles or heavy equipment near Porcupine Creek during topsoil stripping or other surface disturbance. If the South Porcupine tract is leased and proposed for mining by PRC, the North Antelope Rochelle Mine does not presently intend to mine through Mike's Draw and the potential habitat for this species would not be disturbed under the Proposed Action or Alternative 2.

It is possible that existing reservoirs and ponds (natural and those enhanced by CBNG discharge waters), and those created for flood control, sedimentation, water storage purposes, or wetland mitigation measures could provide suitable foraging or breeding habitat for northern leopard frogs in the future. However, most artificial water structures would still be limited to relatively shallow, seasonal waters with little emergent vegetation that would not provide for the year-round habitat needs of this frog species. Should those efforts result in improved aquatic habitats, adult frogs, tadpoles, and/or egg masses present in

the area could be injured or killed during activities associated with additional construction of diversion dikes or associated channels, or the dewatering of potential habitats downstream of a dike. Under those limited circumstances, potential impacts could include loss of individuals and foraging habitat, increased predation, and changes in stream morphology and hydrology. Standard mining procedures, such as the use of silt barriers across affected stream channels and other similar efforts, would minimize any negative impacts that might result from mine-related operations. Likewise, adherence to the TBNG Plan Standards and Guidelines (USFS 2002) pertaining to water and wetlands would ensure that leopard frogs and other aquatic organisms present on USFS lands would not be negatively affected by increased sedimentation, degraded water chemistry, or otherwise damaged aquatic habitats.

Determination of Effect and Rationale – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, USFS lands and adjacent non-federal lands within the North, South and West Hilight Field general analysis areas do not contain suitable habitat for northern leopard frogs. Water sources in the drainages in those areas are too temporary and shallow to support tadpoles until metamorphosis, or to allow frogs to successfully overwinter. If present, individual adult leopard frogs may be incidentally killed by vehicles or equipment. Habitat may be enhanced or created during certain mine operations, but water flow and depth associated with existing structures at the adjacent mines have not resulted in adequate conditions to support the life cycle needs of this species, and they are not expected to create those conditions anywhere in these three LBA tracts. As no northern leopard frogs have ever been documented on USFS lands within the overall general analysis areas for the North Hilight Field, South Hilight Field and West Hilight Field LBA Tracts, potential effects are expected to be negligible, if they occur at all. Furthermore, northern leopard frogs have been documented at other sites outside of the tracts' general analysis areas that will not be affected by coal leasing actions.

Determination of Effect and Rationale – North and South Porcupine LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As indicated, USFS lands and adjacent non-federal lands within the North and South Porcupine tracts' general analysis areas do not currently contain suitable habitat for northern leopard frogs. Water sources in the drainages in those areas are too temporary and shallow to support tadpoles until metamorphosis, or to allow frogs to successfully overwinter. If present, individual adult leopard frogs may be incidentally killed by vehicles or equipment. Habitat may be enhanced or created during certain mine operations, but water flow and depth associated with existing structures at the adjacent North Antelope Rochelle Mine has not resulted in adequate conditions

to support the life cycle needs of this species, and they are not expected to create those conditions anywhere in these two LBA tracts. As no northern leopard frogs have ever been documented on USFS lands within the overall general analysis areas for the North Porcupine and South Porcupine LBA Tracts, potential effects are expected to be negligible, if they occur at all. Furthermore, northern leopard frogs have been documented at other sites outside of the tract's general analysis area that will not be affected by coal leasing actions.

### H-3.2.19 Black-tailed prairie dog (*Cynomys ludovicianus*)

The black-tailed prairie dog was removed from the USFWS federal listing process in 2004. The agency ruled that listing this species may be warranted, but was precluded by higher priority considerations. Consequently, the black-tailed prairie dog is no longer considered a candidate species under the Endangered Species Act (ESA).

Black-tailed prairie dogs historically ranged throughout the Great Plains in short-grass and mixed-grass prairies. This species is also a common resident in the short- and mid-grass habitats of eastern Wyoming (Cerovski et al. 2004). The TBNG, which includes USFS lands in the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine LBA Tracts, harbors one of the seven major colony complexes remaining in North America. Black-tailed prairie dogs are highly social, diurnal burrowing rodents that typically feed on grasses and forbs. Prairie dogs form colonies that are the main unit of a prairie dog population. This species has the ability to rapidly expand its distribution and population if not limited by pest control practices or disease, and will readily spread into recently disturbed areas. Many species such as the black-footed ferret, mountain plover, burrowing owl, and swift fox are dependent on prairie dogs during a portion of their life cycle. Black-tailed prairie dog occupied range and abundance has declined dramatically, and continues to exhibit a slow decline (NatureServe 2007). Major factors contributing to the decline include disease (sylvatic plague), urbanization, habitat conversion, and control efforts.

Existing Conditions – North Hilight Field LBA Tract

No prairie dog colonies were present on USFS lands within the North Hilight Field LBA Tract general analysis area or its 2-mile perimeter in 2007. Four prairie dog colonies (approximately 53.8 total acres) were found on non-federal surface in the wildlife survey area for the North Hilight Field tract (Figure H-1). Of which, two colonies occurred within the general analysis area for the tract and are approximately 3.4 and 19.5 acres in size. The other two colonies were in the surrounding 2-mile perimeter, and are about 3.7 and 27.2 acres in size.

None of these four colonies meet the 80-acre minimum for black-footed ferret habitat (USFWS 1989). However, the focus area for ferret reintroduction efforts is outside the coal mine region of the PRB of northeast Wyoming (refer to Management Area 3.63) (USFS 2002, Grenier 2003). That coal region includes

all USFS and surrounding lands within the general analysis area for the North Hilight Field LBA Tract. Additionally, some prairie dog colonies in that coal region were recently infested with the plague, while others are currently exposed to year-round disturbance associated with conventional oil and gas, CBNG, and coal (including open pits) resources, as well as seasonal recreational shooting and vehicular travel.

Existing Conditions – South Hilight Field LBA Tract

A total of seven prairie dog colonies (approximately 177.2 total acres) were found within 2 miles of the general analysis area for the South Hilight Field LBA Tract in 2007, four of which were present on USFS lands. One colony (approximately 0.1 acre in size) on USFS lands was in the general analysis area itself, while the other three colonies on USFS lands were in the surrounding 2-mile perimeter, and ranged in size from 7.7 to 89.1 acres, for a total of approximately 118 acres. Three additional prairie dog colonies were recorded on non-federal surface within or overlapping the 2-mile wildlife survey area (Figure H-2) in 2007, all three of which were outside of the tract's general analysis area. The total area for those three colonies was approximately 59 non-contiguous acres, and the sizes range from about 2 to 54 acres.

Only the 89.1-acre colony meets the 80-acre minimum for black-footed ferret habitat (USFWS 1989). As noted above, that colony is not on USFS lands nor is it within the general analysis area for the South Hilight Field LBA Tract. However, the focus area for ferret reintroduction efforts is outside the coal mine region of the PRB of northeast Wyoming (refer to Management Area 3.63) (USFS 2002, Grenier 2003). That coal region includes all USFS and surrounding lands within the general analysis area for the South Hilight Field LBA Tract. Additionally, some prairie dog colonies in that coal region were recently infested with the plague, while others are currently exposed to year-round disturbance associated with conventional oil and gas, CBNG, and coal (including open pits) resources, as well as seasonal recreational shooting and vehicular travel.

Existing Conditions – West Hilight Field LBA Tract

A total of eight prairie dog colonies (approximately 167.5 total acres) were found within the wildlife survey area for the West Hilight Field LBA Tract in 2007, three of which were present on USFS lands. The West Hilight Field wildlife survey area for this tract includes lands added by the BLM under Alternative 3 and the surrounding 2-mile perimeter. One colony (approximately 89.1 acres in size) on USFS lands was in the general analysis area itself, while the other two colonies on USFS lands were in the surrounding 2-mile perimeter, and ranged from less than 1 acre to about 7 acres in size, for a total of approximately 96 acres. Five additional prairie dog colonies were recorded on non-federal surface within or overlapping the 2-mile wildlife survey area (Figure H-3) in 2007, all five of which were outside of the tract's general analysis area. No colonies were present on adjacent lands within Alternative 3. The total area for those five colonies was approximately 63 non-contiguous acres, and the sizes range from about 2.6 to 27.2 acres.

Only the 89.1-acre colony meets the 80-acre minimum for black-footed ferret habitat (USFWS 1989). As noted above, that colony is on USFS lands and is also within the general analysis area for the West Hilight Field LBA Tract. However, the focus area for ferret reintroduction efforts is outside the coal mine region of the PRB of northeast Wyoming (refer to Management Area 3.63) (USFS 2002, Grenier 2003). That coal region includes all USFS and surrounding lands within the general analysis area for the West Hilight Field LBA Tract. Additionally, some prairie dog colonies in that coal region were recently infested with the plague, while others are currently exposed to year-round disturbance associated with conventional oil and gas, CBNG, and coal (including open pits) resources, as well as seasonal recreational shooting and vehicular travel.

Existing Conditions – North Porcupine LBA Tract

Surveys have been conducted to locate prairie dog colonies within the 2-mile wildlife survey area surrounding the general analysis area for North Porcupine LBA Tract (Figure H-4). No prairie dog colonies were present on USFS lands within the North Porcupine tract's general analysis area in 2007. Seventeen prairie dog colonies totaling approximately 1,211.4 non-contiguous acres were present within or overlapped the 2-mile wildlife survey area surrounding the North Porcupine tract's general analysis area in 2007 (Figure H-4). Only one colony (approximately 18.6 acres in size) was within the general analysis area itself. The remaining 16 colonies ranged from 1.5 to 345.3 acres in size.

The entire coal mine region of the PRB of northeast Wyoming, including all USFS and surrounding lands within the general analysis area for the South Porcupine LBA Tract, is beyond the focus area for ferret reintroduction efforts on the TBNG and in the general region (refer to Management Area 3.63-USFS 2002, Grenier 2003). Additionally, some prairie dog colonies in that region are currently experiencing development associated with conventional oil and gas, CBNG, and coal (including open pits) resources. Year-round human activity and disturbance are already present in a few locations.

Existing Conditions – South Porcupine LBA Tract

Surveys have been conducted to locate prairie dog colonies within the 2-mile wildlife survey area surrounding the general analysis area for South Porcupine LBA Tract (Figure H-5). No prairie dog colonies were present within the general analysis area for the tract in 2007. Ten prairie dog colonies totaling approximately 476.3 non-contiguous acres were present within or overlapped the 2-mile wildlife survey area surrounding the South Porcupine tract's general analysis area in 2007 (Figure H-5). The largest colony was approximately 345.3 acres in size; this colony is within both North and South Porcupine tracts' wildlife survey areas. The remaining nine colonies were all less than 40 acres in size.

The entire coal mine region of the PRB of northeast Wyoming, including all USFS and surrounding lands within the general analysis area for the South Porcupine LBA Tract, is beyond the focus area for ferret reintroduction efforts

on the TBNG and in the general region (refer to Management Area 3.63-USFS 2002, Grenier 2003). Additionally, some prairie dog colonies in that region are currently experiencing development associated with conventional oil and gas, CBNG, and coal (including open pits) resources. Year-round human activity and disturbance are already present in a few locations.

Direct and Indirect Effects – North, South and West Hilight Field LBA Tracts

The current mining plans for the Black Thunder and Jacobs Ranch mines do not project any new surface disturbance in the two prairie dog colonies located within the general analysis area for the North Hilight Field LBA Tract. Nevertheless, those two colonies would be affected by the proposed leasing action at some point in time. As stated above, neither colony is located on USFS lands. Such impacts could have immediate results on prairie dogs if an occupied colony is suddenly subjected to the effects of a soil salvage operation, or is otherwise impacted in a short timeframe that precludes the dispersal of individuals prior to surface disturbance. However, as those activities typically occur incrementally across various portions of future mining areas, some individuals could disperse to undisturbed portions of the affected colony, or create one or more new colonies within the area.

The current mining plans for the Black Thunder Mine do not project any new surface disturbance in the one prairie dog colony that is located within the general analysis area for the South Hilight Field LBA Tract. Nevertheless, that colony would be affected by the proposed leasing action at some point in time. As stated above, that very small colony (approximately 0.1 acre in size) is located on USFS lands. Such impacts could have immediate results on prairie dogs if an occupied colony is suddenly subjected to the effects of a soil salvage operation, or is otherwise impacted in a short timeframe that precludes the dispersal of individuals prior to surface disturbance. However, as those activities typically occur incrementally across various portions of future mining areas, some individuals could disperse to undisturbed portions of the affected colony, or create one or more new colonies within the area.

The current mining plans for the Black Thunder Mine do not project any new surface disturbance in the one prairie dog colony that is located within the general analysis area for the West Hilight Field LBA Tract. Nevertheless, that colony would be affected by the proposed leasing action at some point in time. As stated above, that colony (89.1 acres in size) is located on USFS lands. Such impacts could have immediate results on prairie dogs if an occupied colony is suddenly subjected to the effects of a soil salvage operation, or is otherwise impacted in a short timeframe that precludes the dispersal of individuals prior to surface disturbance. However, as those activities typically occur incrementally across various portions of future mining areas, some individuals could disperse to undisturbed portions of the affected colony, or create one or more new colonies within the area.

Smaller-scale disturbances associated with both the mining and CBNG industries can also impact prairie dog colonies and surrounding vegetation through fragmentation or loss of foraging and burrowing habitat. Linear disturbances associated with mining infrastructure, such as roads, power lines, fences, and pipelines will occur within narrow corridors over relatively short distances, and would be completed within shorter timeframes than the advancement of a surface mine pit. However, such disturbances would still pose some level of risks due to vehicular collisions or by enhancing habitat for mammalian and avian species that prey on prairie dogs.

Some linear impacts could be minimized or mitigated through the consolidation of roads and electric utilities within common corridors, applying perch deterrents on overhead power poles, and reseeding pipeline disturbances quickly with appropriate seed mixes for the region. Minor surface disturbance near existing colonies would provide recently upturned soils that could facilitate the expansion of the existing colonies or the establishment of new ones, as prairie dogs will readily move into recently disturbed areas. Post-mining reclamation could have similar potential benefits; prairie dogs have already demonstrated their ability to inhabit reclaimed lands at the nearby Antelope Mine (BLM 2008).

All USFS Standards and Guidelines applicable to black-tailed prairie dogs outlined in the TBNG Plan (USFS 2002, page 1-20) would be implemented. To reduce risks and habitat loss for prairie dogs and other wildlife species closely associated with prairie dog colonies, new roads will be aligned outside colony boundaries where possible. If it is necessary to place a new road within a prairie dog colony, the amount of road in the colony will be minimized to the extent that soil, drainage, topographical and other physical factors will allow.

Direct and Indirect Effects – North and South Porcupine LBA Tracts

The North Porcupine LBA tract and its general analysis area are almost entirely encompassed by the existing North Antelope Rochelle Mine permit area; therefore, it is possible that surface disturbance associated with coal removal from the mine's current leases could occur on the tract regardless of whether or not additional leasing occurs in that area. As stated above, one colony (approximately 18.6 acres in size) was within the general analysis area for the North Porcupine LBA Tract in 2007; however, that colony is not located on USFS lands. That one colony would be affected by the proposed leasing action at some point in time. Mining disturbance associated with the adjacent North Antelope Rochelle Mine could impact those prairie dog colonies that exist elsewhere within the larger wildlife survey area surrounding this LBA tract (Figure H-4). Such impacts could have immediate results on prairie dogs if an occupied colony is abruptly subjected to a soil salvaging operation, or is otherwise impacted in a short timeframe that precludes dispersal prior to disturbance. However, as those activities typically occur incrementally across various portions of a mine permit area, some individuals could disperse to

undisturbed portions of the affected colony, or create one or more new colonies within the general area.

The South Porcupine LBA tract and its general analysis area are almost entirely encompassed by the existing North Antelope Rochelle Mine permit area; therefore, it is possible that surface disturbance associated with coal removal from the mine's current leases could occur on the tract, regardless of whether or not additional leasing occurs in that area. As no colonies are present in the South Porcupine tract's general analysis area, leasing and mining this LBA tract under either the Proposed Action or Alternative 2 would not disturb any existing prairie dog colonies. However, mining disturbance associated with the adjacent North Antelope Rochelle Mine could impact those prairie dog colonies that exist elsewhere within the larger wildlife survey area surrounding the tract (Figure H-5). Such impacts could have immediate results on prairie dogs if an occupied colony is abruptly subjected to a soil salvaging operation, or is otherwise impacted in a short timeframe that precludes dispersal prior to disturbance. However, as those activities typically occur incrementally across various portions of a mine permit area, some individuals could disperse to undisturbed portions of the affected colony, or create one or more new colonies within the general area.

Smaller-scale disturbances associated with both the mining and CBNG industries can also impact prairie dog colonies and surrounding vegetation through fragmentation or loss of foraging and burrowing habitat. Linear disturbances associated with mining infrastructure, such as roads, power lines, fences, and pipelines will occur within narrow corridors over relatively short distances, and would be completed within shorter timeframes than the advancement of a surface mine pit. However, such disturbances would still pose some level of risks due to vehicular collisions or by enhancing habitat for mammalian and avian species that prey on prairie dogs.

Some linear impacts could be minimized or mitigated through the consolidation of roads and electric utilities within common corridors, applying perch deterrents on overhead power poles, and reseeding pipeline disturbances quickly with appropriate seed mixes for the region. Minor surface disturbance near existing colonies would provide recently upturned soils that could facilitate the expansion of the existing colonies or the establishment of new ones, as prairie dogs will readily move into recently disturbed areas. Post-mining reclamation could have similar potential benefits; prairie dogs have already demonstrated their ability to inhabit reclaimed lands at the nearby Antelope Mine (BLM 2008).

As no prairie dog colonies are present on USFS lands within the North and South Porcupine tracts' general analysis areas, no USFS Standards and Guidelines applicable to black-tailed prairie dogs would be implemented.

Determination of Effect and Rationale – North Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Only two of the four black-tailed prairie dog colonies within the wildlife survey areas for the North Hilight Field LBA Tract would be physically disturbed by mining activities within the tract's general analysis area, if the lease is issued. Those two colonies encompassed less than 23 acres, and neither of which were on USFS lands in 2007. Given the fact that two of the four colonies within the wildlife survey areas for the North Hilight Field LBA Tract were outside of the general analysis area (area of potential surface disturbance) associated with this proposed lease, the tendency of prairie dogs to disperse and expand their boundaries, and the incremental nature of surface coal mining relative to some other disturbance activities, the potential impacts to prairie dog colonies on and near USFS lands in the North Hilight Field LBA Tract would not have adverse consequences for the viability of the local or regional population. Disturbance and reclamation efforts will occur incrementally in varying locations throughout the permit area as mining progresses through the approved lease.

Determination of Effect and Rationale – South Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Only one of the seven black-tailed prairie dog colonies within the wildlife survey area for the South Hilight Field LBA Tract would be physically disturbed by mining activities within the tract's general analysis area, if the lease is issued. That colony encompassed less than 1 acre in 2007, and it was on USFS lands. Given the fact that six of the seven colonies within the wildlife survey area for the South Hilight Field LBA Tract were outside of the general analysis area (area of potential surface disturbance) associated with this proposed lease, the tendency of prairie dogs to disperse and expand their boundaries, and the incremental nature of surface coal mining relative to some other disturbance activities, the potential impacts to prairie dog colonies on and near USFS lands in the South Hilight Field LBA Tract would not have adverse consequences for the viability of the local or regional population. Disturbance and reclamation efforts will occur incrementally in varying locations throughout the permit area as mining progresses through the approved lease.

Determination of Effect and Rationale – West Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Only one of the eight black-tailed prairie dog colonies within the wildlife survey area for the West Hilight Field LBA Tract would be physically disturbed by mining activities within the tract's general analysis area, if the lease is issued. That colony encompassed 89.1 acres in 2007, and it was on USFS lands. Given the fact that seven of the eight colonies within the wildlife survey area for the West Hilight Field LBA Tract were outside of the general

analysis area (area of potential surface disturbance) associated with this proposed lease, the tendency of prairie dogs to disperse and expand their boundaries, and the incremental nature of surface coal mining relative to some other disturbance activities, the potential impacts to prairie dog colonies on and near USFS lands in the West Hilight Field LBA Tract would not have adverse consequences for the viability of the local or regional population. Disturbance and reclamation efforts will occur incrementally in varying locations throughout the permit area as mining progresses through the approved lease.

Determination of Effect and Rationale – North Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No black-tailed prairie dog colonies would be physically disturbed by mining activities on USFS lands within the tract's general analysis area, if the lease is issued. Only one colony (approximately 18.6 acres in size) is present on non-federal lands in the North Porcupine tract general analysis area. Prairie dog colonies located within the existing North Antelope Rochelle Mine permit area could be impacted by mining operations regardless of whether the North Porcupine LBA Tract is leased. Given the limited additional impacts to prairie dog colonies within the North Porcupine tract's general analysis area, the tendency of prairie dogs to disperse and expand their boundaries, and the incremental nature of surface coal mining relative to some other disturbance activities, the potential impacts to prairie dog colonies on and near USFS lands in the North Porcupine tract's wildlife survey area would not have adverse consequences for the viability of the local or regional population. Disturbance and reclamation efforts will occur incrementally in varying locations throughout the permit area as mining progresses through the approved lease.

Determination of Effect and Rationale – South Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No black-tailed prairie dog colonies would be physically disturbed by mining activities on USFS lands within the tract's general analysis area, if the lease is issued. No colonies are present on either federal or non-federal lands in the South Porcupine tract's general analysis area. Prairie dog colonies located within the existing North Antelope Rochelle Mine permit area could be impacted by mining operations regardless of whether the South Porcupine LBA Tract is leased. Given the tendency of prairie dogs to disperse and expand their boundaries, and the incremental nature of surface coal mining relative to some other disturbance activities, the potential impacts to prairie dog colonies on and near USFS lands in the South Porcupine tract's wildlife survey area would not have adverse consequences for the viability of the local or regional population. Disturbance and reclamation efforts will occur incrementally in varying locations throughout the permit area as mining progresses through the approved lease.

### H-3.2.20 Swift Fox (*Vulpes velox*)

The swift fox was removed from the USFWS federal listing process in 1995, after extensive field surveys demonstrated that the population was greater than expected. This species is considered to be common within the eastern Great Plains grasslands of Wyoming (Cerovski et al. 2004), though it typically occurs at very low densities. The exact status of the population is unknown but believed to be increasing, especially in the Northern Plains. Swift foxes are largely nocturnal and typically prefer flat to gently rolling, short- or mixed-grass prairies, generally lacking in shrubs or woody vegetation (Cotterill 1997). This species uses multiple den sites year-round for shelter, protection from predators, and rearing young. Burrows of other mammals such as badgers (*Taxidea taxus*), red foxes (*Vulpes vulpes*), and prairie dogs are often used or modified for those purposes. Small to mid-sized mammals constitute the bulk of their diet. Swift foxes have little fear of humans and may den in proximity to human disturbances (residences and busy roadways). This tolerance also makes them susceptible to trapping, vehicle collisions, and attacks by dogs. Major threats faced by the swift fox include habitat loss and degradation, interspecific competition with red fox and coyote (*Canis latrans*), and vehicle collisions.

Existing Conditions – North, South and West Hilight Field LBA Tracts

Swift fox have been observed in large grassland blocks in southern Campbell County with more frequency in recent years, and are presumed to breed there. This species has also been documented within the overall TBNG. However, sagebrush communities dominate the general analysis areas for the North Hilight Field, South Hilight Field, and West Hilight Field LBA Tracts, as well as USFS lands in that area. The prevalence of sagebrush throughout this area largely explains the extremely limited sightings of this grassland fox over the last 25 years, as described below. Burrows within the existing black-tailed prairie dog colonies and scattered badger or red fox burrows could be used by swift foxes as den or shelter sites, and swift fox could forage in the area.

No specific surveys for swift fox were conducted for this analysis. However, such efforts were completed in 2002 using USFS survey protocols for other unrelated projects. Those surveys occurred within 13.5 miles of USFS lands in the North Hilight Field Tract's general analysis area; within 2.0 miles of USFS lands in the South Hilight Field Tract's general analysis area; and within 6.0 miles of USFS lands in the West Hilight Field Tract's general analysis area. Nocturnal spotlight surveys for rabbits and hares were conducted as part of annual wildlife monitoring at adjacent existing mines every year since at least 1994, with diurnal surveys for a variety of vertebrate species occurring across all seasons annually since the early 1980s. All of those survey efforts overlapped significant portions of the North Hilight Field, South Hilight Field, and West Hilight Field tract's wildlife survey areas.

As a result of those combined efforts, one swift fox sighting was made approximately 5 miles south of the North Hilight Field tract, on USFS lands in the South Hilight Field tract, along Little Thunder Creek between 1995 and

1997, in T.43N., R.71W., SE¼ Section 23 (USFS 2003). A lone fox was also observed on adjacent lands in T.43N., R.71W., SW¼ Section 14 during that period. No swift foxes have ever been recorded on USFS or other lands within the general analysis areas for the North and West Hilight Field LBA Tracts. No swift foxes have been recorded elsewhere in the overall Black Thunder Mine annual monitoring area since surveys began in 1983.

Few other swift fox sightings have been recorded elsewhere within the surrounding region during specific surveys or incidental to other searches at local mines over the last 25 years. Those efforts were conducted as part of annual wildlife monitoring by contract and USFS biologists on private and federal lands in the area. One swift fox was documented approximately 4 to 6 miles south of USFS lands within the general analysis area for the South Hilight Field tract, in T.42N., R.70W., SE¼ Section 15, during spotlight trapping efforts for sage-grouse at the nearby North Antelope Rochelle Mine in March 2002. The nearest other sighting occurred in T.43N., R.72W., SE¼ Section 20 between 1995 and 1997. Reports from all annual monitoring and special studies are on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

Existing Conditions – North and South Porcupine LBA Tracts

Swift fox have been observed in large grassland blocks in southern Campbell County with more frequency in recent years, and are presumed to breed there. This species has also been documented within the overall TBNG.

Sagebrush communities generally dominate the wildlife survey area for the North Porcupine LBA Tract, though grasslands are more prevalent in the southwestern portion of the tract's general analysis area. Potential swift fox habitat in that area is largely restricted to the western extent, west of the Antelope Road (Figure H-4). The South Porcupine tract's general analysis area is dominated by various native and introduced grassland species considered suitable habit for this species. However, the prevalence of sagebrush throughout these two tracts' wildlife survey areas largely explains the extremely limited sightings of this grassland fox over the last 25 years of monitoring efforts. Burrows within the existing black-tailed prairie dog colonies and scattered badger or red fox burrows could be used by swift foxes as den or shelter sites, and swift fox could forage in the area.

No specific surveys for swift fox were conducted for this analysis. However, such efforts were completed in 2002 using USFS survey protocols for other unrelated projects. Those surveys included USFS lands within and immediately adjacent to the North and South Porcupine tracts' general analysis areas, as well as additional lands in the surrounding area. Nocturnal spotlight surveys for rabbits and hares were conducted as part of annual wildlife monitoring at adjacent existing mines every year since at least 1994, with diurnal surveys for a variety of vertebrate species occurring across all seasons annually since the early 1980s. All of those survey efforts overlapped all or

significant portions of the North and South Porcupine tracts' wildlife survey areas. Despite those combined survey efforts, no swift fox have ever been recorded on USFS or other lands within the North and South Porcupine tracts' general analysis areas.

Few other swift fox sightings have been recorded elsewhere within the North Porcupine tract's wildlife survey area or surrounding region during specific surveys or incidental to other searches at local mines over the last 25 years. Those efforts were conducted as part of annual wildlife monitoring by USFS and contract biologists on private and federal lands in the area. One swift fox was documented on USFS lands approximately 0.5 mile northeast of the North Porcupine tract's general analysis area in March 2002. The fox was observed in T.42N., R.70W., SE¼ Section 15 during spotlight trapping efforts for sage-grouse at the nearby North Antelope Rochelle Mine. Swift fox have been observed on private surface in the southwestern portion of the two-mile wildlife survey area for the South Porcupine tract in recent years. Two individuals (an adult and juvenile) were observed during spotlight lagomorph surveys conducted for the adjacent Antelope Mine on private surface (in T.41N., R.71W., NW¼ SW¼ Section 22 and NE¼ SW¼ Section 22, respectively) approximately 4 miles south of the North Porcupine tract's general analysis area in October 2005. A pair of swift foxes was observed in the adjacent sections to the west and south during similar spotlight surveys conducted in both 2006 and 2007.

Direct and Indirect Effects – North, South and West Hilight Field LBA Tracts

Due to the overall poor quality habitat conditions on USFS and adjacent lands in the North Hilight Field, South Hilight Field and West Hilight Field LBA Tracts' general analysis areas, and the sightings of very few swift fox in that general area over the last 25 years of annual monitoring (including spotlight searches for other species), no direct or indirect impacts are anticipated for this species. Given these circumstances, species-specific Standards and Guidelines outlined in the TBNG Plan (USFS 2002, page 1-20) would not apply.

Direct and Indirect Effects – North and South Porcupine LBA Tracts

Due to absence of swift fox observations in the general analysis area for the North Porcupine tract, the limited presence of suitable habitats on USFS and adjacent lands in that area and the surrounding wildlife survey area, and the lone sighting of a single swift fox in that area over the last 25 years of annual monitoring (including spotlight searches for other species), no direct or indirect impacts are anticipated for this species within the North Porcupine tract's general analysis area. Given these circumstances, species-specific Standards and Guidelines outlined in the TBNG Plan (USFS 2002, page 1-20) would not apply.

Suitable but unoccupied swift fox habitat is present on and near USFS lands and adjacent lands within the general analysis area for the South Porcupine LBA Tract, though individuals have been observed in recent years

approximately 1.25 miles to the southwest, within the surrounding wildlife survey area for this LBA tract. Should this species be present on those lands in the future, direct loss of or injury to individuals foraging or denning within, or passing through that area could result from vehicle collisions or encounters with equipment associated with mine-related activities. Swift fox are relatively tolerant of human activities, but may avoid areas directly affected by mine operations as human presence and noise escalate with active mining. As the population size and residency status of the individuals in the area are largely unknown, some swift fox may remain within undisturbed habitats in the vicinity of mining encroachment.

For the South Porcupine LBA Tract, the Proposed Action or Alternatives could also disturb potential swift fox foraging, denning, or shelter habitat on USFS and adjacent lands within the tract's general analysis area. Those habitats could be removed, altered, or fragmented to varying degrees by one or more mine- or non-mine-related activities such as topsoil removal and a variety of linear disturbances (e.g., roads, fences, power lines, and pipelines). However, the latter disturbances will occur within narrow corridors over relatively short distances, and will typically be completed within a few days. Linear disturbances and habitat alterations could also provide convenient travel corridors and habitat for larger mammalian predators that could compete with swift foxes for prey species. The type, timing, location, and extent of habitat disturbance will vary throughout the general analysis area and on USFS lands as mining operations progress. Reclamation of disturbed areas will occur incrementally as mining is completed in a given portion of the area, and will eventually provide additional foraging and potential denning habitat for the swift fox. Surface disturbing activities may result in a short-term, localized decrease in prey base (small rodents and voles), but due to their high reproductive potential and tendencies to re-establish and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance. Should swift fox be documented on or adjacent to USFS lands in the tract's general analysis area, that agency would determine whether species-specific Standards and Guidelines outlined in the TBNG Plan (USFS 2002, page 1-20) would apply.

Determination of Effect and Rationale – North Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Habitat conditions in the North Hilight Field tract's general analysis area are considered poor quality due to the prevalence of sagebrush shrublands and limited presence of grassland expanses. Only two observations of swift fox have been recorded in the general region despite annual monitoring surveys in all or most of those areas over the last 25 years, and both were 4 to 5 miles south of this LBA tract. Furthermore, sufficient suitable habitat (grasslands) is present elsewhere within the general vicinity that could sustain swift foxes as project activities disturb the general analysis area for the North Hilight Field LBA tract. Existing and future reclaimed grasslands will create or

enhance potential swift fox habitat once mining has been completed in the tracts.

Determination of Effect and Rationale – South Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Habitat conditions in the South Hilight Field tract's general analysis area are considered poor quality due to the prevalence of sagebrush shrublands and limited presence of grassland expanses. The only swift fox observation ever recorded on USFS lands in the South Hilight Field Tract occurred along Little Thunder Creek 11 to 13 years ago, despite annual monitoring surveys in all or most of those areas during and subsequent to that time. Only one other observation of a swift fox has been recorded in the tract's wildlife survey area during that period, although it was outside of the tract's general analysis area. Furthermore, sufficient suitable habitat (grasslands) is present elsewhere within the general vicinity that could sustain swift foxes as project activities disturb the general analysis area for this LBA tract. Existing and future reclaimed grasslands will create or enhance potential swift fox habitat once mining has been completed in the tract.

Determination of Effect and Rationale – West Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Habitat conditions in the West Hilight Field tract's general analysis area are considered poor quality due to the prevalence of sagebrush shrublands and limited presence of grassland expanses. Only two swift fox observations have ever been recorded near this tract, both of which occurred approximately 13 years ago on adjacent lands roughly one mile east of the tract's general analysis area. Furthermore, sufficient suitable habitat (grasslands) is present elsewhere within the general vicinity that could sustain swift foxes as project activities disturb the general analysis area for this LBA tract. Existing and future reclaimed grasslands will create or enhance potential swift fox habitat once mining has been completed in the tract.

Determination of Effect and Rationale – North Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Habitat for this species on USFS lands within the western portion of the general analysis area for the North Porcupine LBA Tract is currently considered as suitable but unoccupied. No fox sightings have been documented on those USFS lands during specific and incidental surveys conducted over the last 25 years (1984-2007). Only four sightings have been recorded within or near the tract's two-mile wildlife survey area during that period: one in 2002, and three since 2005. The three most recent sightings were at least 3 miles to the south, and on the far side of a railroad and county road between the sightings and the nearest USFS lands.

Determination of Effect and Rationale – South Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Habitat for this species on USFS lands within the general analysis area for the South Porcupine LBA Tract is currently considered as suitable but unoccupied. No fox sightings have been documented on those USFS lands during specific and incidental surveys conducted over the last 25 years (1984-2007). Only four sightings have been recorded within or near the South Porcupine tract's two-mile wildlife survey area during that period: one in 2002, and three since 2005. The three most recent sightings were at least 1.75 miles to the southwest, and on the far side of a railroad and county road between the sightings and the nearest USFS lands.

### H-3.2.21 Long-billed curlew (*Numenius americanus*)

Long-billed curlews breed from interior British Columbia and southern Alberta through southern Manitoba, south to central California, and east to western North Dakota, central South Dakota, central Nebraska, western Kansas, northeastern New Mexico, and northern Texas (Dechant et al. 2003a). The long-billed curlew is a relatively uncommon summer resident of grasslands and sagebrush-grasslands in Wyoming (Cerovski et al. 2004). Curlews are ground nesters, and require large open expanses of grassland, with relatively low vegetation and few shrubs in which to nest (Hill 1998). The nest is typically a shallow scrape or depression, thinly lined with grass, weeds or cow dung, typically near water or moist areas.

Curlews use historically occupied sites each year, and some individual birds may reuse the same territories from year to year (Dechant et al. 2003a). Curlews primarily feed upon insects but also eat other invertebrates, small crustaceans, toads, and eggs and nestlings of other birds. This species forages in grasslands, wet meadows, prairie dog colonies, and occasionally along the margins of wetlands. Lakeshores and river valleys are often used during fall as migration staging areas (Hill 1998). Although some populations may be declining, overall population trends suggest long-billed curlew numbers are stable or increasing slightly. The major factor affecting curlew populations is habitat destruction and fragmentation.

Existing Conditions – North, South and West Hilight Field LBA Tracts

Long-billed curlews are uncommon summer residents within the TBNG. The areas evaluated for this analysis include USFS and adjacent lands within the general analysis areas for the North, South and West Hilight Field LBA Tracts. As described above for the northern leopard frog and swift fox, those areas are dominated by sagebrush habitats with scattered stands of upland grasslands and few surface water features. No significant wetlands (i.e., large lakes) or other persistent water conditions that might attract large numbers of curlews during migration exist within the North, South and West Hilight Field tracts' wildlife survey areas. Consequently, habitat conditions in the tracts' general analysis areas and surrounding lands would be suitable for foraging migrants,

but they do not provide large expanses of grassland areas for nesting activities. No long-billed curlews have ever been documented on USFS lands or adjacent lands in the general analysis areas or larger wildlife survey areas for the North, South and West Hilight Field LBA Tracts. Likewise, few curlews have been observed in the surrounding region during annual wildlife monitoring in the area over the last 24 or more years. Most of those sightings occurred during spring months and beyond USFS lands, and were likely individual migrants or non-breeding adults.

No nesting occurrences have been documented for long-billed curlews in southern Campbell County (Cerovski et al. 2004), including USFS lands in the North, South and West Hilight Field tracts' general analysis areas and adjacent lands. Potential foraging habitat is present on USFS and adjacent lands in those areas and elsewhere within the 2-mile wildlife survey perimeters, but nesting habitat conditions are poor to unsuitable. CBNG development activities occur throughout the region, with active mining (including open pits) also occurring in the near vicinity. Therefore, potential foraging habitats would be disturbed by the Proposed Action and Alternatives for these three LBA tracts.

Existing Conditions – North and South Porcupine LBA Tracts

Long-billed curlews are uncommon summer residents within the TBNG. However, no nesting occurrences have been documented for long-billed curlews in southern Campbell County (Cerovski et al. 2004), including USFS lands in the North and South Porcupine tracts' general analysis areas and adjacent lands. As described above, the general analysis area for the North Porcupine tract is dominated by sagebrush habitats and the general analysis area for the South Porcupine tract is dominated by upland grassland habitats. No significant wetlands (i.e., large lakes) or other persistent water conditions that might attract large numbers of curlews during migration exist within either the North or South Porcupine tracts' wildlife survey areas. Consequently, habitat conditions in these two LBA tracts' general analysis areas and surrounding lands would be suitable for foraging migrants, and they do not provide large expanses of grassland areas for nesting activities.

No long-billed curlews have ever been documented on USFS lands in the general analysis areas or larger wildlife survey areas for the North and South Porcupine LBA Tracts. Likewise, few curlews have been observed in the surrounding region during annual wildlife monitoring conducted in the general area over the last 25 years. Those general surveys occurred repeatedly throughout the breeding season each year. All curlew sightings that have occurred in the general region over time were recorded during spring months and were beyond USFS lands; those individuals were likely migrants or non-breeding adults.

Direct and Indirect Effects

Given the lack of sightings of long-billed curlews in the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts and surrounding areas over the last 25 years, and the fact that habitat conditions in those areas are only suitable for foraging migrants or non-breeding adults, the Proposed Action and Alternatives for each of the LBA tracts are unlikely to cause any direct injury or mortality to this species. However, if migrants were present, future mining activities could result in injuries or mortalities to foraging individuals. Foraging individuals may also be displaced by human activities and noise associated with mining. Potential foraging habitats may be disturbed, removed, or fragmented by mining activities. The type, timing, location, and extent of habitat disturbance will vary throughout the tracts' general analysis areas as operations progress. Reclamation of disturbed areas will occur incrementally as mining is completed in given portions of the three applicant mines, and will eventually mitigate impacts to some degree. The Jacobs Ranch, Black Thunder, and North Antelope Rochelle mine's reclamation plans would incorporate the replacement of jurisdictional wetland acreages existing prior to mining with at least equal types and numbers of wetland acreages. The creation of wetland habitats, especially where adjacent to native or reclaimed grassland habitats, could provide additional (although limited) foraging areas for curlews.

As no long-billed curlews have been documented within USFS lands or other lands in or near the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts' general analysis areas, and habitat conditions do not provide quality nesting areas, species-specific Standards and Guidelines outlined in the Grassland Plan (USFS 2002) would not apply.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. As this species appears to be an infrequent visitor to the six WAC LBA tracts' general analysis areas, and good quality foraging and nesting habitat is not present within the general Wright analysis area, impacts to this species are likely to be minimal. Loss, degradation, or fragmentation of potential foraging habitat and potential collisions with vehicles may occur. Enhanced water features and grasslands created by reclamation may provide some limited foraging or nesting habitats.

### H-3.2.22 Ferruginous hawk (*Buteo regalis*)

Ferruginous hawks breed throughout much of the western United States and portions of three Canadian provinces (Johnsgard 1990). This species nests throughout Wyoming (Cerovski et al. 2004) and occupies portions of the state during winter. Large expanses of grassland and shrubland, where livestock grazing (vs. cultivation) is the predominant land use, provide the most suitable habitat (Schmutz 1989, Johnsgard 1990). Most ferruginous hawks in the PRB

nest on the ground (usually elevated sites, though some pairs nest in small trees). Typical nest sites include hilltops, rock outcrops, eroded creek banks, small trees, and even relatively level ground. The ferruginous hawk relies primarily on two mammalian families for the majority of its prey: *Leporidae* (rabbits and hares) and *Sciuridae* (ground squirrels and prairie dogs). Numerous nests can occur within the territory of a single pair, and ferruginous hawks often reuse nests for many years.

This species may be sensitive to human disturbance, especially during the nesting period (White and Thurow 1985). This sensitivity can be heightened in years of low prey abundance. Accurate information regarding the trend for the ferruginous hawk is limited and mixed. Some populations may be declining (Bechard and Schmutz 1995); however, overall population trends suggest numbers are stable or increasing (NatureServe 2007). Major factors affecting ferruginous hawk populations include habitat destruction and fragmentation, and human disturbance.

Existing Conditions – North Hilight Field LBA Tract

Annual monitoring has documented that ferruginous hawks nested in the vicinity of the Black Thunder Mine during each of the last 25 years, and fledged young in all but one of those years. Similar long-term nesting has occurred at the neighboring Jacobs Ranch and North Antelope Rochelle mines. Many of those nests were located on USFS lands. Details describing the number of intact and active nests within the mine monitoring survey areas in a given year are available in annual monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

The presence or absence of nest material does not determine whether the USFS considers a site as "active" (occupied during at least 1 of the last 7 years). No ferruginous hawk nest sites have been documented on USFS lands within the North Hilight Field tract's general analysis area or surrounding 2-mile wildlife survey area during annual wildlife monitoring surveys conducted through 2007. Seven nest sites in two territories have been recorded on non-federal surface within the general analysis area through 2007; five of the seven sites still had nest material present that year (Figure H-1). Through 2007, 24 individual ferruginous hawk nests plus 3 multi-species sites used by ferruginous hawks and at least one other raptor species over the years have been identified within the tract's 2-mile wildlife survey area. The 27 nests represented at least 10 different territories. All but 9 of the 27 sites still had nest material present in 2007.

Existing Conditions – South Hilight Field LBA Tract

Annual monitoring has documented that ferruginous hawks nested in the vicinity of the Black Thunder Mine during each of the last 25 years, and fledged young in all but one of those years. Similar long-term nesting has occurred at the neighboring Jacobs Ranch and North Antelope Rochelle mines. Many of

those nests were located on USFS lands. Details describing the number of intact and active nests within the mine monitoring survey areas in a given year are available in annual monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

The presence or absence of nest material does not determine whether the USFS considers a site as "active" (occupied during at least 1 of the last 7 years). Seven ferruginous hawk nest sites in two territories have been documented on USFS lands within the South Hilight Field tract's general analysis area during annual wildlife monitoring surveys conducted through 2007 (Figure H-2). Two of the seven sites still had nest material present that year. No nest sites were present on non-federal lands within the general analysis area during any monitoring year.

Nine additional ferruginous hawk nest sites in five territories have been recorded on USFS surface within the tract's 2-mile wildlife survey area through 2007; two of the nine sites had been used by ferruginous hawks and at least one other raptor species over the years. Five nest sites were still physically present in 2007. The remaining 30 nest sites (25 individual nests plus 5 multi-species sites) are located on non-federal lands within the 2-mile wildlife survey area; none of those nests are within the tract's general analysis area itself. The 30 nests were in at least 10 different territories. Only 10 of the 30 sites still had nest material present in 2007.

Existing Conditions – West Hilight Field LBA Tract

Annual monitoring has documented that ferruginous hawks nested in the vicinity of the Black Thunder Mine during each of the last 25 years, and fledged young in all but one of those years. Similar long-term nesting has occurred at the neighboring Jacobs Ranch and North Antelope Rochelle mines. Many of those nests were located on USFS lands. Details describing the number of intact and active nests within the mine monitoring survey areas in a given year are available in annual monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

The presence or absence of nest material does not determine whether the USFS considers a site as "active" (occupied during at least 1 of the last 7 years). Three ferruginous hawk nest sites in two territories have been documented on USFS lands within the West Hilight Field tract's general analysis area during annual wildlife monitoring surveys conducted through 2007. Two sites still had nest material present that year (Figure H-3).

Only one additional nest site has been recorded on USFS surface within the 2-mile wildlife survey area through 2007. No material was present at the nest site in 2007. Nine additional nest sites in three territories were present on non-federal lands within the tract's general analysis area during the 2007 survey. Nest material was present at four of the nine sites that year.

An additional 40 nest sites (24 individual nests plus 6 multi-species sites) were located on non-federal lands within the tract's 2-mile wildlife survey area through 2007. The 40 nests were in at least 16 different territories. Only 23 of the 40 sites still had nest material present in 2007.

Existing Conditions – North Porcupine LBA Tract

Annual monitoring has documented that ferruginous hawks nested in the vicinity of the North Antelope Rochelle Mine every year since at least 1990, and fledged young in 17 of those 19 years. Similar long-term nesting has occurred at the neighboring Black Thunder and Antelope mines. Ferruginous hawks have nested on USFS lands in the North Porcupine tract's general analysis area. Details describing the number of intact and active nests within the mine monitoring survey areas in a given year are available in annual monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

The presence or absence of nest material does not determine whether the USFS considers a site as "active" (occupied during at least 1 of the last 7 years). In 2007, 73 individual ferruginous hawk nests (21 territories) were present within the North Porcupine tract wildlife survey area, plus 14 other nest sites that have been used by ferruginous hawks and at least one other raptor species over the years (Figure H-4).

Four nest sites were on USFS surface within the general analysis area itself in 2007, three of which still had nest material present. Three additional individual ferruginous hawk nest sites and two multi-species nests were on non-federal lands within the general analysis area in 2007.

Existing Conditions – South Porcupine LBA Tract

Annual monitoring has documented that ferruginous hawks nested in the vicinity of the North Antelope Rochelle Mine every year since at least 1990, and fledged young in 17 of those 19 years. Similar long-term nesting has occurred at the neighboring Black Thunder and Antelope mines. Ferruginous hawks have nested on USFS lands in the South Porcupine tract's general analysis area. Details describing the number of intact and active nests within the mine monitoring survey areas in a given year are available in annual monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

The presence or absence of nest material does not determine whether the USFS considers a site as "active" (occupied during at least 1 of the last 7 years). In 2007, 33 individual ferruginous hawk nests (11 territories) were present within the South Porcupine wildlife survey area, plus 5 other nest sites that have been used by ferruginous hawks and at least one other raptor species over the years (Figure H-5).

Five individual ferruginous hawk nest sites were on USFS lands within the general analysis area itself in 2007, one of which still had nest material present. Five additional individual nest sites were on non-federal lands in that area in 2007.

Direct and Indirect Effects

Over time, the Black Thunder Mine has avoided, where possible, or mitigated mining impacts on raptor nests through a variety of means. The mine has voluntarily monitored nesting raptor populations in a perimeter larger than required annually since 1983, maintained and implemented current USFWS approved Raptor Mitigation Plans, adjusted operations to provide temporal and spatial buffers around raptor nests, and ensured that new power lines at the mine conform to current Avian Power Line Interaction Commission (APLIC) guidelines.

As indicated previously, only a few acres in the North and South Porcupine tracts' general analysis areas are not already encompassed by the existing North Antelope Rochelle Mine's existing permit area. Surface disturbance is therefore likely to occur in those areas, regardless of the proposed leasing decision. However, the North Antelope Rochelle Mine has avoided, where possible, or mitigated mining impacts on raptor nests through a variety of means. The mine has also maintained and implemented current USFWS approved Raptor Mitigation Plans, adjusted operations to provide temporal and spatial buffers around raptor nests, and ensured that new power lines at the mine conform to current Avian Power Line Interaction Commission (APLIC) guidelines.

Provided those practices are continued, direct impacts on ferruginous hawks and their active nest sites will be minimized, both on and near USFS lands. Due to restrictions on disturbance near active nest sites, the most probable source of potential impact to ferruginous hawks themselves would be an increase in injuries and fatalities of individuals foraging within the WAC LBA tracts' general analysis areas due to vehicle collisions associated with ongoing or future mining and other activities. The use of existing roads in the area, when possible, would help to minimize this risk.

Habitat loss, degradation, and fragmentation would result from a variety of large- and small-scale mining operations such as soil salvaging and reservoir/flood construction, among others. Potential nesting and foraging habitat might also be fragmented by linear disturbances such as the construction, maintenance, and removal of roads, fences, power lines, and pipelines. Those disturbances could also create new travel corridors for mammalian predators that reside in or pass through the area. However, many such disturbances would occur within narrow corridors over relatively short distances, typically over a period of days. Additionally, those structures are often constructed immediately prior to the removal of similar features elsewhere in the area, often resulting in minimal or no net gain of new linear disturbances. All mine-related habitat disturbances would shift throughout

the expanded permit area as operations progress. Reclamation of disturbed areas would occur incrementally as resource recovery is completed in a given portion of the mine, and would mitigate impacts to some degree. Surface disturbing activities could also result in a short-term, localized decrease in the prey base (lagomorphs and rodents) for ferruginous hawks. However, due to their high reproductive potential and tendencies to re-populate and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance.

USFS Standards and Guidelines would be implemented and offer additional protections for active nests; they would apply only to activities outside of the lease area. These protocols should help ensure that the Proposed Action and Alternatives do not significantly degrade the quality of existing ferruginous hawk territories and nest sites. Standards and Guidelines specific to ferruginous hawks outlined in the TBNG Plan (USFS 2002, page 1-20-21) are as follows:

73. To help prevent abandonment, reproductive failure or nest destruction, prohibit development of new facilities within 0.25 mile (or line of sight) of active ferruginous hawk nests. For the ferruginous hawk, a nest is no longer considered active if it is known to have been unoccupied for the last seven years. This does not apply to pipelines, fences and underground utilities.

74. To help reduce disturbances to nesting ferruginous hawks, prohibit the following activities within 0.5 mile (or line of sight) of active ferruginous hawk nests from 1 March through 31 July: construction (e.g., roads, water impoundments, oil and gas facilities), reclamation, gravel mining operations, drilling of water wells, and oil and gas drilling.

75. To help reduce disturbances to nesting ferruginous hawks, do not authorize the following activities within 0.5 mile (line of sight) of active ferruginous hawk nests from 1 March through 31 July: construction (e.g., pipelines, utilities, fencing), seismic exploration, and workover operations for maintenance of oil and gas wells.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area.

Mine-related activities will not physically disturb any ferruginous hawk nest sites on USFS lands in the North Hilight Field tract's general analysis area. All ferruginous hawk nests located within the South Hilight Field tract's general analysis area are located on federal surface. Most ferruginous hawk nests located within the West Hilight Field tract's general analysis area are located on non-federal surface. Mine-related activities will likely disturb ferruginous hawk

nest sites on USFS lands in the North Porcupine tract's wildlife survey area. Mine-related activities will likely disturb ferruginous hawk nest sites on USFS lands in the South Porcupine tract's wildlife survey area. Some individuals or pairs may experience disturbance, destruction, or fragmentation of nesting and foraging habitat. However, ferruginous hawks typically have alternate nest sites within the same territories, and therefore many alternative nests occur beyond the tracts' general analysis areas and thus are less likely to be impacted by future mining disturbance associated with the proposed leasing actions.

Increased disturbance to individuals due to human activity may also occur. However, several factors should minimize the potential mining-related impacts on this species, including the availability of alternate nest sites located further away from pending disturbance in each affected territory, implementation of USFWS and USFS approved mitigation measures, reclaiming habitats as soon as feasible, encouraging nesting within mine reclamation lands through artificial nest structures and habitat features such as rock piles and tree plantings that attract prey species, and continued monitoring of this species to ensure that mitigation methods are applied when necessary.

### H-3.2.23 Burrowing owl (*Athene cunicularia*)

Burrowing owls breed from southern Alberta to southwestern Saskatchewan, south through east-central Washington, central Oregon, and southern California, and east to eastern North Dakota, west-central Kansas, and Texas (Klute et al. 2003, pg 7). The burrowing owl is a summer resident of open rangeland habitats throughout Wyoming (Cerovski et al. 2004). This species requires burrows of fossorial mammals, primarily badgers and prairie dogs, for nesting and roosting (Klute et al. 2003, pg 12).

Most burrowing owl nests within the TBNG are located within prairie dog colonies (USFS 2003). Burrowing owls typically reuse traditional nesting areas. Burrow mounds, shrubs, fence posts or boulders may be used as observation perches. This species is usually tolerant of human activity but is vulnerable to predation by pets (cats, dogs). Burrowing owls forage within a variety of habitats, including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas. This species is often active during daylight hours. Insects and small mammals (mice and voles) are the owls' primary prey items. Burrowing owl populations have been declining throughout its range, primarily due to habitat loss.

Existing Conditions – North, South and West Hilight Field LBA Tracts

Burrowing owls are common summer residents within the TBNG (Cerovski et al. 2004). This species was first recorded nesting in the Black Thunder Mine annual monitoring 2-mile perimeter in 1988. Despite the presence of potential nesting habitat (prairie dog and badger burrows) in the monitoring area, this species nested in only 5 of the subsequent 19 years. All known burrowing owl nest sites in the mine monitoring area have been in prairie dog burrows. Four

artificial nest boxes have been constructed in the mine's 2-mile perimeter wildlife survey area for mitigation purposes over the years, but no owls have ever been observed at or near them.

No burrowing owl nest sites have been documented on USFS lands within the North Hilight Field tract's general analysis area or the tract's surrounding wildlife survey area through 2007. Two nest sites in one territory have been identified in a small (18 acres) prairie dog colony on non-federal lands located within the tract's general analysis area (Figure H-1). The colony is approximately 4 miles west of the nearest USFS lands within the tract's general analysis area, and 3 miles northwest of the nearest USFS lands in the surrounding 2-mile perimeter. The USFS buffer for this species is 0.25 mile. A smaller (3 acres) colony is also present in the general analysis area, but no burrowing owls have been recorded there. One artificial nest box (BO5) was created in the LBA tract's 2-mile wildlife survey area, but it has never been used by burrowing owls.

No burrowing owl nest sites had been documented within the entire South Hilight Field tract's general analysis area or the tract's surrounding wildlife survey area through 2007, including all USFS lands in that area. Only one small (less than 1 acre) prairie dog colony (potential burrowing owl nesting habitat) is present within the tract's general analysis area, though larger colonies do occur in the surrounding 2-mile wildlife survey area (Figure H-2). Badger burrows undoubtedly occur in the area, but are not typically recorded.

No burrowing owl nest sites had been documented within the general analysis area for the West Hilight Field LBA Tract through 2007, including USFS lands within that area. One burrowing owl nest site has been recorded on non-federal lands in the northwestern corner of the general analysis area and approximately 0.25 mile from the nearest USFS lands (Figure H-3). The disturbance-free buffer for active nests of this species is 0.25 mile. This nest site was active in 2007, but no young fledged. Two additional burrowing owl nest sites (one territory) have been documented in the northeastern portion of the two-mile wildlife survey area. Those nests are located within the North Hilight Field LBA Tract as applied for (refer to Section H-3.3.23). Potential nesting habitat for burrowing owls is present in a prairie dog colony (approximately 89 acres in size) within the West Hilight Field tract's general analysis area, which is located on USFS lands. Another prairie dog colony (about 7 acres in size) is located about 0.25 mile east of the West Hilight Field tract's general analysis area (Figure H-3), and in any badger burrows that might be present in the area would also provide potential nesting habitat for burrowing owls.

Existing Conditions – North and South Porcupine LBA Tracts

Burrowing owls are common summer residents within the TBNG (Cerovski et al. 2004). This species was observed nested in the North Antelope Rochelle Mine's monitoring area in 1985 and 1989. Despite the presence of potential

nesting habitat (prairie dog and badger burrows) in the monitoring area, nesting owls were not found again until 1997. Burrowing owls have nested in the mine's monitoring area in most years since then, especially within a prairie dog colony located in T.41N., R.70W., Section 17, just east of the southeastern corner of the South Porcupine LBA Tract (Figure H-5).

One burrowing owl nest site has been identified in a small (19 acres in size) prairie dog colony within the North Porcupine tract's general analysis area. This colony and nest site are located immediately adjacent to USFS lands (Figure H-4). The USFS buffer for this species is 0.25 mile. No burrowing owl nest sites have been documented on USFS lands within the North Porcupine tract's general analysis area. A total of seven nest sites have been recorded on USFS lands in the surrounding wildlife survey area through 2007; one of which is in a prairie dog colony located approximately 0.25 mile east of the general analysis area, in T.42N., R.70W., Section 25.

No burrowing owl nest sites had been documented within the South Porcupine tract's general analysis area through 2007, including USFS lands in that area. Eleven nest sites have been recorded in the surrounding 2-mile wildlife survey area: one on USFS lands and 10 on non-federal surface. Seven of those 11 nest sites were in a single prairie dog colony located approximately 0.4 mile east of the southeastern corner of this general analysis area in T.41N., R.70W., Section 17 (Figure H-5).

Direct and Indirect Effects – North Hilight Field LBA Tract

No known burrowing owl nest sites are present on USFS lands in the general analysis area for the North Hilight Field LBA Tract, or within 0.25 mile of those lands (the USFS buffer for that species). Potential nesting habitat in the vicinity of this LBA tract is largely limited to the two relatively small prairie dog colonies located in the tract's general analysis area. Therefore, leasing the North Hilight Field LBA Tract would not result in any direct or indirect effects to nesting burrowing owls. Both USFS Standards and Guidelines (USFS 2002) and Black Thunder Mine's mine permit (TBCC 2005) stipulate that clearance surveys will be conducted and approved by the appropriate agencies before any colony is disturbed during the breeding season. That process will preclude most direct impacts to new nesting burrowing owls in that area.

Due to the strong (but not exclusive) relationship between burrowing owls and prairie dog colonies, many of the indirect effects described above for the black-tailed prairie dog, would also apply to burrowing owls and, thus, will not be repeated in full detail here. Because burrowing owls are active during daylight hours, the most probable source of direct impacts would be the death of, or injury to, individuals fleeing heavy equipment, or being killed or injured by equipment while feeding or moving through the mine area. Burrowing owls are generally tolerant of human activities, but increased presence and noise, especially during the nest initiation period, may displace individuals or inhibit

nesting proximate to mine operations. Foraging could also be hindered within these areas, especially where mining activities occur near prairie dog colonies.

As described previously, mining could eventually disturb or eliminate prairie dog colonies (potential nesting habitat) in the general analysis area for the North Hilight Field LBA Tract (21 total acres). However, the limited presence or long-term absence of nesting burrowing owls in those colonies, in combination with the presence of other non-disturbed colonies in the area and the ability for prairie dogs to recolonize reclamation, would mitigate those losses to a large extent. Surface disturbing activities could also result in a short-term, localized decrease in the prey base (rodents, non-flying insects) for burrowing owls. However, due to their high reproductive potential and tendencies to re-populate and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance.

Additionally, the tendency of prairie dogs to quickly colonize nearby areas when their colonies are disturbed would create new nesting habitat for burrowing owls. Overall, nesting and foraging habitats will be incrementally affected by a variety of large-and small-scale operations. The type, timing, location, and extent of habitat disturbance will vary throughout the general analysis area as mining operations progress, thus providing opportunities for burrowing owls to relocate to other suitable habitat within the immediate area.

Reclamation will proceed incrementally as areas are mined and activities move to new locations within the mine area. Both activities will create loose soil that should be attractive to dispersing prairie dogs (potential habitat source), at least in the short term. Reclamation of disturbed areas will occur incrementally as resources are extracted in a given portion of the mine, and will eventually mitigate habitat impacts to some degree. However, to date, burrowing owls have rarely been documented nesting within reclaimed habitats at surface mines in the PRB of northeast Wyoming.

If nesting burrowing owls are documented on or near USFS lands in the North Hilight Field LBA Tract, USFS Standards and Guidelines applicable to this species would be implemented on applicable lands to offer additional protections beyond those outlined in the USFWS approved Raptor Mitigation Plan for the Black Thunder Mine. Annual monitoring of known burrowing owl nest sites within the 2-mile wildlife survey area for the mine, including USFS and adjacent lands, and other nearby colonies will continue through the life of the mine to document their histories of occupancy and production.

Direct and Indirect Effects – South Hilight Field LBA Tract

No known burrowing owl nest sites are present on USFS lands in the general analysis area for the South Hilight Field LBA Tract, or within 0.25 mile of those lands (the USFS buffer for that species). Potential nesting habitat is largely limited to a lone, very small prairie dog colony in the tract's general analysis area. Therefore, leasing the South Hilight Field LBA Tract would not result in any direct or indirect effects to nesting burrowing owls. Both USFS Standards

and Guidelines (USFS 2002) and the Black Thunder Mine's mine permit (TBCC 2005) stipulate that clearance surveys will be conducted and approved by the appropriate agencies before any colony is disturbed during the breeding season. That process will preclude most direct impacts to new nesting burrowing owls in that area.

Because burrowing owls are active during daylight hours, the most probable source of direct impacts would be the death of, or injury to, individuals fleeing heavy equipment, or being killed or injured by equipment while feeding or moving through the mine area. Burrowing owls are generally tolerant of human activities, but increased presence and noise, especially during the nest initiation period, may displace individuals or inhibit nesting proximate to mine operations. Foraging could also be hindered within these areas, especially where mining activities occur near prairie dog colonies.

As described previously, mining could eventually disturb or eliminate prairie dog colonies (potential nesting habitat) in the general analysis area for the South Hilight Field LBA Tract (1 acre). However, the limited presence or long-term absence of nesting burrowing owls in that colony, in combination with the presence of other non-disturbed colonies in the area and the ability for prairie dogs to recolonize reclamation, would mitigate those losses to a large extent. Surface disturbing activities could also result in a short-term, localized decrease in the prey base (rodents, non-flying insects) for burrowing owls. However, due to their high reproductive potential and tendencies to re-populate and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance.

Additionally, the tendency of prairie dogs to quickly colonize nearby areas when their colonies are disturbed would create new nesting habitat for burrowing owls. Overall, nesting and foraging habitats will be incrementally affected by a variety of large-and small-scale operations. The type, timing, location, and extent of habitat disturbance will vary throughout the general analysis area as mining operations progress, thus providing opportunities for burrowing owls to relocate to other suitable habitat within the immediate area.

Reclamation will proceed incrementally as areas are mined and activities move to new locations within the mine area. Both activities will create loose soil that should be attractive to dispersing prairie dogs (potential habitat source), at least in the short term. Reclamation of disturbed areas will occur incrementally as resources are extracted in a given portion of the mine, and will eventually mitigate habitat impacts to some degree. However, to date, burrowing owls have rarely been documented nesting within reclaimed habitats at surface mines in the PRB of northeast Wyoming.

If nesting burrowing owls are documented on or near USFS lands in the South Hilight Field LBA Tract, USFS Standards and Guidelines applicable to this species would be implemented on applicable lands to offer additional protections beyond those outlined in the USFWS approved Raptor Mitigation

Plan for the Black Thunder Mine. Annual monitoring of known burrowing owl nest sites within the 2-mile wildlife survey area for the mine, including USFS and adjacent lands, and other nearby colonies will continue through the life of the mine to document their histories of occupancy and production.

Direct and Indirect Effects – West Hilight Field LBA Tract

No known burrowing owl nest sites are present on USFS lands in the general analysis area for the West Hilight Field LBA Tract. One existing nest site is approximately 0.25 mile of those lands (the USFS buffer for that species is 0.25 mile). Potential nesting habitat in the vicinity of this LBA tract is largely limited to the large prairie dog colony located along Little Thunder Creek within the tract's general analysis area. Therefore, leasing the West Hilight Field LBA Tract would not result in any direct or indirect effects to nesting burrowing owls. Both USFS Standards and Guidelines (USFS 2002) and the Black Thunder Mine's mine permit (TBCC 2005) stipulate that clearance surveys will be conducted and approved by the appropriate agencies before any colony is disturbed during the breeding season. That process will preclude most direct impacts to new nesting burrowing owls in that area.

Because burrowing owls are active during daylight hours, the most probable source of direct impacts would be the death of, or injury to, individuals fleeing heavy equipment, or being killed or injured by equipment while feeding or moving through the mine area. Burrowing owls are generally tolerant of human activities, but increased presence and noise, especially during the nest initiation period, may displace individuals or inhibit nesting proximate to mine operations. Foraging could also be hindered within these areas, especially where mining activities occur near prairie dog colonies.

As described previously, mining could eventually disturb or eliminate prairie dog colonies (potential nesting habitat) on USFS lands in the West Hilight Field tract's general analysis area (approximately 89 acres). However, the limited presence or long-term absence of nesting burrowing owls in that colony, in combination with the presence of other non-disturbed colonies in the area and the ability for prairie dogs to recolonize reclamation, would mitigate those losses to a large extent. Surface disturbing activities could also result in a short-term, localized decrease in the prey base (rodents, non-flying insects) for burrowing owls. However, due to their high reproductive potential and tendencies to re-populate and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance.

Additionally, the tendency of prairie dogs to quickly colonize nearby areas when their colonies are disturbed would create new nesting habitat for burrowing owls. Overall, nesting and foraging habitats will be incrementally affected by a variety of large-and small-scale operations. The type, timing, location, and extent of habitat disturbance will vary throughout the general analysis area as mining operations progress, thus providing opportunities for burrowing owls to relocate to other suitable habitat within the immediate area.

Reclamation will proceed incrementally as areas are mined and activities move to new locations within the mine area. Both activities will create loose soil that should be attractive to dispersing prairie dogs (potential habitat source), at least in the short term. Reclamation of disturbed areas will occur incrementally as resources are extracted in a given portion of the mine, and will eventually mitigate habitat impacts to some degree. However, to date, burrowing owls have rarely been documented nesting within reclaimed habitats at surface mines in the PRB of northeast Wyoming.

If nesting burrowing owls are documented on or near USFS lands in the West Hilight Field LBA Tract, USFS Standards and Guidelines applicable to this species would be implemented on applicable lands to offer additional protections beyond those outlined in the USFWS approved Raptor Mitigation Plan for the Black Thunder Mine. Annual monitoring of known burrowing owl nest sites within the 2-mile wildlife survey area for the mine, including USFS and adjacent lands, and other nearby colonies will continue through the life of the mine to document their histories of occupancy and production.

Direct and Indirect Effects – North Porcupine LBA Tract

No known burrowing owl nest sites are present on USFS lands in the general analysis area for the North Porcupine LBA Tract. However, leasing the North Porcupine LBA Tract could result in direct or indirect effects on two nest sites located within 0.25 mile of USFS lands in that tract; one of which is within the tract's general analysis area itself, while the other is located immediately east of the tract's general analysis area (Figure H-4). That distance represents the USFS buffer for this species. Most nesting has occurred in prairie dog colonies in or near the tract's general analysis area, though badger burrows have also been used. Both USFS Standards and Guidelines (USFS 2002) and the North Antelope Rochelle Mine's mine permit (PRC 2004) stipulate that clearance surveys will be conducted and approved by the appropriate agencies before any colony is disturbed during the breeding season. That process will preclude most direct impacts to new nesting burrowing owls in that area.

Due to the strong (but not exclusive) relationship between burrowing owls and prairie dog colonies, many of the indirect effects described above for the black-tailed prairie dog would also apply to burrowing owls and, thus, will not be repeated in full detail here. Because burrowing owls are active during daylight hours, the most probable source of direct impacts would be the death of, or injury to, individuals fleeing heavy equipment, or being killed or injured by equipment while feeding or moving through the mine area. Burrowing owls are generally tolerant of human activities, but increased presence and noise, especially during the nest initiation period, may displace individuals or inhibit nesting proximate to mine operations. Foraging could also be hindered within these areas, especially where mining activities occur near prairie dog colonies.

As described previously, only one prairie dog colony (approximately 18.6 acres in size) is present on non-federal lands in the North Porcupine tract general

analysis area. Prairie dog colonies located within the existing North Antelope Rochelle Mine permit area could be impacted by mining operations regardless of whether the North Porcupine LBA Tract is leased. If the North Porcupine tract is leased, mining could eventually disturb or eliminate the prairie dog colony (potential nesting habitat) in the tract's general analysis area. Mining could eventually disturb or eliminate prairie dog colonies on adjacent lands in or within 0.25 mile of the North Porcupine tract's general analysis area. However, the generally limited presence of active burrowing owl nests, in combination with the presence of other non-disturbed colonies in the general vicinity and the ability for prairie dogs to recolonize reclamation, would mitigate those losses to a large extent. Surface disturbing activities could also result in a short-term, localized decrease in the prey base (rodents, non-flying insects) for burrowing owls. However, due to their high reproductive potential and tendencies to re-populate and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance.

Additionally, the tendency of prairie dogs to quickly colonize nearby areas when their colonies are disturbed would create new nesting habitat for burrowing owls. Overall, nesting and foraging habitats will be incrementally affected by a variety of large-and small-scale operations. The type, timing, location, and extent of habitat disturbance will vary throughout the general analysis area as mining operations progress, thus providing opportunities for burrowing owls to relocate to other suitable habitat within the immediate area.

Reclamation will proceed incrementally as areas are mined and activities move to new locations within the mine area. Both activities will create loose soil that should be attractive to dispersing prairie dogs (potential habitat source), at least in the short term. Reclamation of disturbed areas will occur incrementally as resources are extracted in a given portion of the mine, and will eventually mitigate habitat impacts to some degree. However, to date, burrowing owls have rarely been documented nesting within reclaimed habitats at surface mines in the PRB of northeast Wyoming.

If nesting burrowing owls are documented on or near USFS lands in the North Porcupine LBA Tract, USFS Standards and Guidelines applicable to this species would be implemented on applicable lands to offer additional protections beyond those outlined in the USFWS approved Raptor Mitigation Plan for the North Antelope Rochelle Mine. Annual monitoring of known burrowing owl nest sites within the 2-mile wildlife survey area for the mine, including USFS and adjacent lands, and other nearby colonies will continue through the life of the mine to document their histories of occupancy and production.

Direct and Indirect Effects – South Porcupine LBA Tract

No known burrowing owl nest sites are present on USFS lands in the general analysis area for the South Porcupine LBA Tract. Most nesting has occurred in prairie dog colonies near each general analysis area, though badger burrows

have also been used. Both USFS Standards and Guidelines (USFS 2002) and the North Antelope Rochelle Mine's mine permit (PRC 2004) stipulate that clearance surveys will be conducted and approved by the appropriate agencies before any colony is disturbed during the breeding season. That process will preclude most direct impacts to new nesting burrowing owls in that area.

Due to the strong (but not exclusive) relationship between burrowing owls and prairie dog colonies, many of the indirect effects described above for the black-tailed prairie dog would also apply to burrowing owls and, thus, will not be repeated in full detail here. Because burrowing owls are active during daylight hours, the most probable source of direct impacts would be the death of, or injury to, individuals fleeing heavy equipment, or being killed or injured by equipment while feeding or moving through the mine area. Burrowing owls are generally tolerant of human activities, but increased presence and noise, especially during the nest initiation period, may displace individuals or inhibit nesting proximate to mine operations. Foraging could also be hindered within these areas, especially where mining activities occur near prairie dog colonies.

As described previously, no prairie dog colonies (potential burrowing owl nesting habitat) are present in the general analysis area for the South Porcupine LBA Tract. Two colonies are however located within approximately 0.25 mile of the South Porcupine tract's general analysis area, both of which are within North Antelope Rochelle Mine's existing permit area, and mining could eventually disturb or eliminate those colonies regardless of whether the South Porcupine LBA Tract is leased. However, the generally limited presence of active nests, in combination with the presence of other non-disturbed colonies in the area and the ability for prairie dogs to recolonize reclamation, would mitigate those losses to a large extent. Surface disturbing activities could also result in a short-term, localized decrease in the prey base (rodents, non-flying insects) for burrowing owls. However, due to their high reproductive potential and tendencies to re-populate and adapt to disturbed and reclaimed areas, prey numbers should increase quickly after the disturbance.

Additionally, the tendency of prairie dogs to quickly colonize nearby areas when their colonies are disturbed would create new nesting habitat for burrowing owls. Overall, nesting and foraging habitats will be incrementally affected by a variety of large-and small-scale operations. The type, timing, location, and extent of habitat disturbance will vary throughout the general analysis area as mining operations progress, thus providing opportunities for burrowing owls to relocate to other suitable habitat within the immediate area.

Reclamation will proceed incrementally as areas are mined and activities move to new locations within the mine area. Both activities will create loose soil that should be attractive to dispersing prairie dogs (potential habitat source), at least in the short term. Reclamation of disturbed areas will occur incrementally as resources are extracted in a given portion of the mine, and will eventually mitigate habitat impacts to some degree. However, to date,

burrowing owls have rarely been documented nesting within reclaimed habitats at surface mines in the PRB of northeast Wyoming.

If nesting burrowing owls are documented on or near USFS lands in the South Porcupine LBA Tract, USFS Standards and Guidelines applicable to this species would be implemented on applicable lands to offer additional protections beyond those outlined in the USFWS approved Raptor Mitigation Plan for the North Antelope Rochelle Mine. Annual monitoring of known burrowing owl nest sites within the 2-mile wildlife survey area for the mine, including USFS and adjacent lands, and other nearby colonies will continue through the life of the mine to document their histories of occupancy and production.

Determination of Effect and Rationale – North Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No burrowing owl nests have been documented on or near USFS lands in the North Hilight Field tract's general analysis area during many years of annual monitoring; only two nests in a single territory are located within the tract's general analysis area. Disturbance, fragmentation, and alteration of foraging and nesting habitats would occur if this tract is leased and mined. However, few prairie dog colonies occur in the general vicinity of this LBA tract, and most are located outside of the tract's general analysis area where future surface disturbance would occur.

The Black Thunder Mine has avoided, where possible, and mitigated such impacts in the past through intensive monitoring of both populations and specific nest sites, implementation of USFWS approved mitigation measures, and adjusting operations to provide temporal and spatial buffers around raptor nests (including burrowing owl nests). Mining activities and noise may disturb individuals inhabiting the lease area, thus inhibiting potential nesting or foraging in proximity to lands with ongoing development. Potential collisions with vehicles might also occur, though none have been recorded in the area to date.

Determination of Effect and Rationale – South Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No burrowing owl nests have been documented on or near USFS lands in the South Hilight Field tract's general analysis area during many years of annual monitoring, nor have any nests been located within the tract's general analysis area itself. Few prairie dog colonies occur in the general vicinity of this LBA tract, and most are located outside of the tract's general analysis area where future surface disturbance would occur.

The Black Thunder Mine has avoided, where possible, and mitigated such impacts in the past through intensive monitoring of both populations and

specific nest sites, implementation of USFWS approved mitigation measures, and adjusting operations to provide temporal and spatial buffers around raptor nests (including burrowing owl nests). Mining activities and noise may disturb individuals inhabiting the lease area, thus inhibiting potential nesting or foraging in proximity to lands with ongoing development. Potential collisions with vehicles might also occur, though none have been recorded in the area to date.

Determination of Effect and Rationale – West Hilight Field LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No burrowing owl nests have been documented on USFS lands in the West Hilight Field tract's general analysis area during many years of annual monitoring, and only a single nest site is located approximately 0.25 mile from the nearest USFS lands in the tract's general analysis area. Disturbance, fragmentation, and alteration of foraging and nesting habitats would occur if this tract is leased and mined. However, excluding the single large colony that is located in the tract's general analysis area, few prairie dog colonies occur in the general vicinity of this LBA tract, and most are located outside of the tract's general analysis area.

The Black Thunder Mine has avoided, where possible, and mitigated such impacts in the past through intensive monitoring of both populations and specific nest sites, implementation of USFWS approved mitigation measures, and adjusting operations to provide temporal and spatial buffers around raptor nests (including burrowing owl nests). Mining activities and noise may disturb individuals inhabiting the lease area, thus inhibiting potential nesting or foraging in proximity to lands with ongoing development. Potential collisions with vehicles might also occur, though none have been recorded in the area to date.

Determination of Effect and Rationale – North Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No burrowing owl nests have been documented on USFS lands in the North Porcupine tract's general analysis area during many years of annual monitoring. A single nest site is located in the only prairie dog colony that is within the tract's general analysis area, and that nest site is immediately adjacent to USFS lands. Disturbance, fragmentation, and alteration of foraging and nesting habitats would occur if this tract is leased and mined. However, most of the prairie dog colonies in the general vicinity are located outside of the tract's general analysis area where future surface disturbance associated with this leasing action would occur.

The North Antelope Rochelle Mine has avoided, where possible, and mitigated such impacts in the past through intensive monitoring of both populations and specific nest sites, implementation of USFWS approved mitigation measures,

and adjusting operations to provide temporal and spatial buffers around raptor nests (including burrowing owl nests). Mining activities and noise may disturb individuals inhabiting the lease area, thus inhibiting potential nesting or foraging in proximity to lands with ongoing development. Potential collisions with vehicles might also occur, though none have been recorded in the area to date.

Determination of Effect and Rationale – South Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No burrowing owl nests have been documented on or within 0.25 mile of USFS lands in the general analysis area for the South Porcupine LBA Tract during many years of annual monitoring. Most prairie dog colonies in the general vicinity are located outside of the tract's general analysis area where future surface disturbance associated with this leasing action would occur.

The North Antelope Rochelle Mine has avoided, where possible, and mitigated impacts in the past through intensive monitoring of both populations and specific nest sites, implementation of USFWS approved mitigation measures, and adjusting operations to provide temporal and spatial buffers around raptor nests (including burrowing owl nests). Mining activities and noise may disturb individuals inhabiting the lease area, thus inhibiting potential nesting or foraging in proximity to lands with ongoing development. Potential collisions with vehicles might also occur, though none have been recorded in the area to date.

### H-3.2.24 Chestnut-collared longspur (*Calcarius ornatus*)

The breeding range of the chestnut-collared longspur extends from southern Alberta to southern Manitoba, south to west-central Colorado, and east through North Dakota and South Dakota to western Minnesota (Dechant et al. 2003b). The chestnut-collared longspur is a common summer resident of the eastern plains of Wyoming (Cerovski et al. 2004). This species prefers native grasslands as breeding sites, inhabiting open prairie and avoiding excessively shrubby areas. Grasslands with dense litter accumulations are also avoided (Dechant et al. 2003b). Scattered shrubs are often used as singing perches. Nests are typically placed in areas of sparse vegetation (less than 50-75 inches or 20-30 centimeters), but usually with a taller grass component than sites preferred by McCown's longspurs. Nests are on the ground in depressions and often placed beside cattle dung, small shrubs, or under a clump of grass (Hill and Gould 1997). Male fidelity to breeding areas has been observed. Chestnut-collared longspurs feed primarily on seeds (especially grasses), insects, and spiders. This species is generally tolerant of short-term intrusion at the nest site but may desert if disturbed during nest building or egg-laying (Hill and Gould 1997). High rates of predation on eggs and nestlings have been reported and pesticides have been shown to reduce hatching success. The chestnut-collared longspur breeding range has contracted and long-term data

suggests population declines (Hill and Gould 1997). These declines have been attributed to loss of native prairie habitat, and conversion to cropland and urban development.

Existing Conditions – North, South and West Hilight Field LBA Tracts

Chestnut-collared longspurs are common summer residents within the TBNG. This species has not been recorded on USFS lands or other lands in the North or South Hilight Field tracts' general analysis areas during annual monitoring in recent years. Individuals of this species were recorded infrequently on non-federal lands in the West Hilight Field tract's general analysis area during annual monitoring in recent years. As described previously, sagebrush habitats dominate USFS and adjacent lands in the general analysis areas for the North Hilight Field, South Hilight Field and West Hilight Field LBA Tracts. Grassland areas are present in the form of upland grasslands, agricultural pasture grasslands, and within prairie dog colonies, but they occur in isolated parcels scattered throughout the area rather than in contiguous and/or sizeable blocks that would be attractive to nesting chestnut-collared longspurs. Consequently, only limited suitable habitat conditions exist for this species on USFS lands in the North Hilight Field, South Hilight Field and West Hilight Field LBA Tracts' general analysis areas and adjacent lands.

Existing Conditions – North and South Porcupine LBA Tracts

Chestnut-collared longspurs are common summer residents within the TBNG. This species has not been recorded on USFS or adjacent lands in the North and South Porcupine tract's general analysis area during annual monitoring conducted in recent years.

The North Porcupine tract's general analysis area is dominated by sagebrush communities. Potential habitat in that area is largely restricted to the western extent, west of the Antelope Road (Figure H-4). The South Porcupine tract's general analysis area is dominated by various native and introduced grassland species. Therefore, the general analysis area for the South Porcupine LBA Tract is considered suitable habitat for this species.

Direct and Indirect Effects

Due to the similarity of potential impacts from future mining on chestnut-collared longspurs and other grassland species previously discussed (e.g., prairie dog and swift fox), detailed descriptions of those impacts are not repeated here. Chestnut-collared longspurs have not been documented as nesting in the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine tracts' general analysis areas. Individuals of this species have been documented on non-federal surface in the larger South Porcupine 2-mile wildlife survey area (Figure H-5); which was presumed due to observations of breeding displays. Equipment operations associated with future mining operations could result in fatalities or injury to individuals, nests and eggs, and/or young. Increased human activity and noise could inhibit foraging or nesting within suitable habitats on USFS lands or displace

individuals during periods of intense activities. Over the life of the mine, potential nesting and foraging habitats in the general analysis areas could be disturbed, destroyed, altered, or fragmented, though the type, timing, location, and extent of habitat disturbance will vary throughout the general analysis areas as mining operations progress. Reclamation of disturbed areas will occur incrementally as resources are extracted in a given portion of the mine. Within 1 to 2 years, newly reclaimed areas may create good quality, short-duration nesting habitat for chestnut-collared longspurs. However, as these sites mature, they would become less suitable as nesting habitat for this species.

Determination of Effect and Rationale – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. USFS lands in the North Hilight Field, South Hilight Field and West Hilight Field tracts' general analysis areas are dominated by sagebrush communities that are not as attractive to grassland species such as the longspur. No individuals have been documented in the general analysis areas for the North Hilight Field and South Hilight Field tracts, and only limited observations of individuals have occurred in the West Hilight Field tract's general analysis area. Potential and documented alternative habitats for chestnut-collared longspurs are present elsewhere in the vicinity in areas not currently scheduled for mining disturbance.

Determination of Effect and Rationale – North and South Porcupine LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Sagebrush dominated areas such as those on USFS and adjacent lands within the North Porcupine tract's general analysis area are not as attractive to grassland species such as longspurs. The grasslands in the South Porcupine tract's general analysis area are more likely to attract these birds than the sagebrush-dominated areas that typically occur in the general Wright analysis area. No individuals have been documented in the North and South Porcupine tracts' general analysis areas or surrounding wildlife survey areas. Potential and documented alternative habitats for chestnut-collared longspurs are present elsewhere in the vicinity in areas not currently scheduled for mining disturbance.

### H-3.2.25 McCown's Longspur (*Calcarius mccownii*)

McCown's longspurs breed from southern Alberta and southern Saskatchewan, south through Montana, eastern and central Wyoming, and north-central Colorado, and east to western Nebraska, north-central South Dakota, and southwestern North Dakota (Dechant et al. 2003c). This species is a common summer resident of the eastern plains and great basin-foothills grasslands, basin-prairie shrublands, and agricultural areas throughout most of Wyoming (Cerovski et al. 2004). Specifically, this species requires open habitats such as sparsely vegetated, low structured grasslands, and heavily grazed pastures

containing a moderate bare ground component for nesting and foraging. Nest sites are typically a natural or shallow scraped depression on the ground placed in the open or beside vegetation such as bunch grasses, cacti, or shrubs. McCown's longspurs feed on seeds of grasses and forbs, insects, and other arthropods. No strong data suggests breeding site fidelity although some individuals may return to the general nesting area in subsequent years.

Individuals vary in response to human intrusion at nest sites, but appear to be relatively more tolerant than most grassland songbird species. High rates of predation on eggs and nestlings occur especially where nests are associated with vegetative structure. Nestlings may also be directly poisoned where insecticides are sprayed in nest areas (With 1994). Populations are declining, especially within the northern portion of the range. Factors directly affecting the McCown's longspur include the reduction of breeding habitat due to overgrazing, control of prairie fires, plowing, development, and excessive use of pesticides. Conversion of short-grass prairie to agriculture and urban development is the most important factor (With 1994).

Existing Conditions – North, South and West Hilight Field LBA Tracts

McCown's longspurs are also common summer residents within the TBNG. Observations of the McCown's longspur mirror those of the chestnut-collared longspur. Neither species has been documented in either the North or South Hilight Field tracts' general analysis areas, and limited sightings of individual birds have been recorded in the West Hilight Field tract's general analysis area in recent years, although no confirmed observations of this species were made on USFS lands in that area. The nearest observation to this general area occurred on non-federal lands in NE¼SW¼ Section 13, T.43N., R.71W. in May 2000. The height and composition of vegetation (i.e., sagebrush) on most USFS lands in the North, South and West Hilight Field tracts' general analysis areas is generally too tall and dense to provide suitable habitat for McCown's longspurs.

Existing Conditions – North and South Porcupine LBA Tracts

This species has not been observed on USFS or adjacent lands in the sagebrush dominated North Porcupine tract's general analysis area or its wildlife survey area. McCown's longspurs were not recorded on USFS lands in the grassland dominated South Porcupine tract's general analysis area, but individuals have been seen occasionally on non-federal lands in and near that area. This species is regularly observed in prairie dog colonies at the neighboring Antelope Mine.

Direct and Indirect Effects

The direct and indirect effects to McCown's longspurs would be the same as those described above for the chestnut-collared longspur.

Determination of Effect and Rationale – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. USFS lands in the North Hilight Field, South Hilight Field and West Hilight Field tracts' general analysis areas are dominated by sagebrush communities that are not as attractive to grassland species such as the longspur. No individuals have been documented in the general analysis areas for the North Hilight Field and South Hilight Field tracts, and only limited observations of individuals have been recorded in the West Hilight Field tract's general analysis area. Potential and documented alternative habitats for McCown's longspurs are present nearby in more appropriate habitats not currently scheduled for mining disturbance.

Determination of Effect and Rationale – North and South Porcupine LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Potential impacts to McCown's longspurs would be the same as those described above for the chestnut-collared longspur in the North and South Porcupine tracts' general analysis areas. However, as reclaimed grasslands mature, they would become less suitable as nesting habitat for this short-grass species.

### H-3.2.26 Greater sage-grouse (*Centrocercus urophasianus*)

The Greater sage-grouse occurs year-round throughout non-forested regions of Wyoming (Cerovski et al. 2004). Sage-grouse rely on a variety of habitats within sagebrush dominated landscapes to reproduce and survive throughout the year. Early in the spring, grouse gather at breeding display sites called leks. Leks are usually in open areas (playas, ridge tops, sparse sagebrush, or burned areas) that are surrounded by dense sagebrush and escape cover. The surrounding area also typically represents nesting, loafing, and foraging habitat.

After being bred, hens typically scratch out a nest under sagebrush (Connelly et al. 1991) within three kilometers of the lek (Schroeder et al. 1999). Nests in some portions of sage-grouse range are typically placed under sagebrush with average height of 36-79 centimeters (Schroeder et al. 1999). However, research conducted within the Southern PRB (Brown and Clayton 2004) indicated that, although shorter sagebrush was present at nest sites, grouse selected shrubs ranging from 55-61 centimeters in height under which to place nests. Re-nesting may occur if the nest is destroyed early during the laying or incubation period. Nest success is enhanced where both sagebrush and residual grass cover are taller and denser (Gregg et al. 1994). Sage-grouse exhibit high fidelity to seasonal ranges, and may return to the same area to nest in subsequent years.

For the first month after hatching, the young depend on relatively open sagebrush stands with an abundance of forbs and insects, especially ants and beetles (Drut et al. 1994, Schroeder et al. 1999). Late-season brood rearing habitats, such as wet meadows and bottomlands, are more mesic and support greater forb cover (Drut et al. 1994). Sage-grouse use a variety of habitats during fall, and the incidence of sagebrush in their diet increases as forbs become less available. During winter, grouse feed upon sagebrush leaves almost exclusively. Winter range is characterized by large expanses of dense, exposed sagebrush. Where snow accumulations are significant, gentle south- and west-facing slopes or windblown ridges are preferred.

Breeding populations of this species have declined by at least 17 to 47 percent throughout much of its range (Connelly et al. 2004). Within Wyoming, sage-grouse populations have generally declined over the past 4 decades. However, sage-grouse population estimates specifically pertaining to the TBNG suggest an overall increase in individuals since 1995. This same general trend was observed both statewide and within the Northeast Wyoming Sage-Grouse Local Working Group (NWSGWG) area.

The NWSGWG identified habitat fragmentation and degradation, disturbance and direct mortality as major influences affecting sage-grouse (NWSGWG 2006). The group identified oil and gas development, vegetation management, invasive plants, and weather as those factors with the most influence on the northeast Wyoming sage-grouse populations and those that may most effectively be addressed to provide the greatest benefit for sage-grouse conservation in northeast Wyoming (NWSGWG 2006).

Existing Conditions – North, South and West Hilight Field LBA Tracts

As described above, USFS lands on and adjacent to the general analysis areas for the North, South, and West Hilight Field LBA Tracts are dominated by a sagebrush-grassland community, primarily big sagebrush, with shrub cover ranging from 55 to 60 percent. Those areas provide potential year-round habitat for sage-grouse, though habitat quality varies. Sagebrush stands range from sparse to moderately dense throughout the areas, with only a marginal grassy understory in many areas.

Despite the prevalence of sagebrush in the combined wildlife survey areas for the North, South and West Hilight Field LBA Tracts, sage-grouse numbers were never especially high in the area. Five sage-grouse leks are located on and within 2 miles of the North, South, and West Hilight Field tracts' general analysis areas: Stuart I, Stuart II, Black Thunder, Butch, and Hansen Lakes (Figures H-1, H-2 and H-3).

No sage-grouse leks are present on USFS lands in the North Hilight Field tract's general analysis area. Two leks are present on non-federal surface in the tract's general analysis area: Butch and Hansen Lakes. The Hansen Lakes lek is immediately south of USFS surface in that area (Figure H-1). The

Hansen Lakes lek is classified as "occupied" by the WGFD (active in at least 1 of the last 10 years). The Butch lek was first recorded in 1990. The peak male count (15) occurred in 1991, after which numbers declined dramatically. No grouse were recorded at the Butch lek during annual checks conducted over the last 14 years (1994 through 2007). The Butch lek is classified as "unoccupied/abandoned" by the WGFD (no activity for 10 consecutive years).

The Butch lek was discovered in 1990, and was active every year through 1993. The Hansen Lakes lek was discovered in 1993, coincidently at the same time peak male counts were dramatically declining at the Butch lek; the leks are approximately 1.5 miles apart. Peak male counts at the Hansen Lakes lek ranged from 14 to 24 birds from 1993 through 2000, but dropped markedly to only 3 birds in 2001. Grouse were present at the lek for the next 2 years, but no birds were observed there after 2003. No other grouse leks are present within 3 miles of the North Hilight Field tract's general analysis area. The next nearest lek is the Stuart II lek, approximately 4.1 miles southwest of the North Hilight Field tract's general analysis area (Figure H-1).

No sage-grouse leks are present on USFS lands in the general analysis area for the South Hilight Field LBA Tract or within that tract's 2-mile wildlife survey area (Figure H-2). Likewise, no lek sites have been documented on non-federal surface in South Hilight Field tract's general analysis area. The former Black Thunder lek was located on non-federal surface approximately 1 mile east of the South Hilight Field tract's general analysis area. The Black Thunder lek was first documented in 1984, when a peak male count of 21 was recorded. Grouse numbers gradually declined over the next several years of annual monitoring, with only one bird observed at the lek in 1993. No grouse were recorded at the Black Thunder lek during annual checks conducted over the subsequent 12 years (1994 through 2005), prior to any mine-related disturbance occurring within several miles. Due to the consistently low counts, WGFD authorized the mine to reduce searches for grouse leks in the permit area and 1-mile perimeter to every third year beginning in 2004 (i.e., 2004, 2007, etc.). That lek was classified as "unoccupied/abandoned" after 10 consecutive years of inactivity, and it was then impacted by topsoil stripping in 2007 and is now officially classified as "unoccupied/destroyed" by WGFD. The Stuart II lek is located on USFS lands approximately 3 miles northwest of the tract's general analysis area (Figure H-2).

The Stuart II lek lies within the general analysis area for the West Hilight Field LBA Tract (Figure H-3), and is the only lek on USFS lands in the combined wildlife survey areas for the three Hilight Field LBA Tracts. Two leks are present on non-federal surface in the vicinity of the West Hilight Field area. The Stuart I lek is approximately 1.25 miles west of the tract's general analysis area, and the next nearest lek is the former Black Thunder site, approximately 2.25 miles east of the tract's general analysis area (Figure H-3).

The Stuart I lek was first recorded in 1977. The peak male count (29) occurred in 1979, with reduced numbers in the subsequent 2 years. The lek was

monitored by the WGFD at approximately 3-year intervals from 1982 through 2003; annual monitoring was conducted by private consultants for unrelated projects each year from 2004 through 2007. Grouse were observed at the lek during only 1 of the 11 survey years from 1982 through 2007. The last sighting occurred in 1991, when two males were recorded at the Stuart I lek. The Stuart II lek was discovered in 1979. Few grouse were seen at the lek over the next 28 years, with a maximum of seven males observed in any survey year. The Stuart II lek was also surveyed primarily at 3-year intervals since its discovery, with annual checks conducted from 2005 through 2007. Because the two Stuart leks were not monitored annually, their management status is "undetermined," despite consistently low counts when surveys did occur.

Grouse counts at these five leks in the combined wildlife survey areas for the North, South and West Hilight Field LBA Tracts were consistently low since their respective discoveries, with few birds observed at any location in the last 7 to 20 years, depending on the lek site. Additionally, records from the WGFD (obtained from D. Thiele, Regional Biologist, WGFD, Buffalo, Wyoming), and USFS have not documented any new sage-grouse leks within the approximately 131 square mile area that encompasses the combined wildlife survey areas for the three Hilight Field LBA Tracts. Telemetry data collected on radio-collared grouse at the nearby North Antelope Rochelle Mine throughout the last 7 years (2001-2007) shows no sage-grouse locations within several miles of the three Hilight Field LBA Tracts during that period (Brown and Clayton 2004, North Antelope Rochelle Mine Annual Wildlife Report 2006, 2007). It is important to note that the reduction in grouse attendance at these five leks, and most others in the PRB, preceded physical mining disturbance and, thus, cannot be directly attributable to mine-related activities (Orpet 2007, McKee 2007). Annual counts for each lek are available in annual monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

Annual surveys for sage-grouse broods were conducted in native and reclaimed stream channels at and around the Black Thunder Mine from 1994 through 1999; such surveys were no longer required by WGFD and WDEQ/LQD after that year due to the consistent lack of grouse broods at coal mines throughout the PRB. No new leks or broods were seen during recent baseline inventories conducted for the three Hilight Field LBA Tracts. All grouse broods that have been recorded over the years occurred as incidental sightings during other wildlife surveys.

Areas of suitable habitat for nesting and strutting grounds are widely known as necessary to sustain sage-grouse populations. One recent study suggests that availability of winter habitat may also affect sage-grouse populations (Naugle et al. 2006). Nesting and winter surveys for sage-grouse are not required as part of the annual wildlife programs for the Black Thunder Mine or other applicant mines discussed in this EIS, though winter surveys have been conducted as part of baseline inventories for previous mine expansions. Additionally, periodic winter surveys for other species (i.e., big game, bald eagle roosts) have

occurred at all three applicant mines in recent years. Due to their proximity to existing mine permit areas, most USFS lands in the North and South Hilight Field tracts' general analysis areas, and those in the eastern half of the West Hilight Field tract's general analysis area, have been included in a minimum of seven consecutive years (big game surveys 1993-1999) of some level of winter surveys, with additional surveys conducted in some subsequent years. No sage-grouse were ever documented in or near those LBA tracts during those winter surveys.

Existing Conditions – North Porcupine LBA Tract

As described above, USFS lands on and adjacent to the general analysis area for the North Porcupine LBA Tract are dominated by a sagebrush-grassland community, primarily big sagebrush, with shrub cover averaging 54 percent in that area. The North Antelope Rochelle Mine, as part of its wildlife monitoring program from 1984 through 1992, conducted voluntary searches for and annual monitoring of sage-grouse leks throughout the mine's original permit area and a 1-mile perimeter. Those surveys became mandatory with the implementation of Appendix B of the WDEQ/LQD Coal Rules and Regulations in 1993, and continued each year through 2007. Radio-telemetry data gathered from grouse collared at the North Antelope Rochelle Mine during a voluntary, multi-year (2001 through 2007) study have demonstrated that most birds in the North and South Porcupine LBA Tracts' 2-mile wildlife survey areas (Figures H-4 and H-5) reside near the mine year-round. Additional details describing the survey and monitoring efforts for sage-grouse at the North Antelope Rochelle Mine are available in annual wildlife monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

Five sage-grouse leks are located within 2 miles of the North Porcupine tract's general analysis area: Payne, Wilson, Rochelle, Kort I, and Kort II (Figure H-4). The Payne and Kort 1 leks are on USFS lands, but only the Payne lek is actually within the LBA tract's general analysis area itself. These five leks are collectively referred to as the Rochelle Complex. The birds in that complex comprise approximately 4 percent of the grouse population in the entire TBNG, and approximately 17 percent of the population in the Hilight Bill Geographic Area.

The Payne lek was first discovered in spring 2001. The peak male count (21) recorded that year was higher than that of any subsequent year. Grouse counts at the Payne lek have fluctuated over the last 7 years, with numbers increasing each year from 2005 through 2007. The average annual peak count for males at the Payne lek since its discovery was 10.5. The Payne lek is currently classified as "occupied."

The Wilson lek has been unoccupied for the last 10 consecutive years, and is therefore considered "unoccupied/abandoned."

The Rochelle lek was discovered in 1990 but experienced reduced attendance after 1992, with birds present in only 3 of the subsequent 11 years. The site may have been a satellite to the Wilson lek, used only when the local grouse population was relatively high or increasing. The Rochelle lek was mined through in 2004, and is now classified as "unoccupied/destroyed."

The Kort I lek was first identified in spring 1998 when, for unknown reasons, grouse apparently shifted their breeding activities from the Wilson lek. Male attendance at the Kort I lek gradually declined through 2004 (low of three males), and the birds shifted their display location to the Kort II lek site in 2005. The average peak male count for the Kort leks since their discovery was 5.2 males per year. The Kort I and Kort II leks are currently classified as "occupied."

Although sage-grouse numbers have generally been low in the combined North and South Porcupine tracts' wildlife survey areas over the years, known or potential grouse habitat is present in both areas. However, the most suitable sage-grouse habitat exists in the North Porcupine area, as suggested by the distribution of grouse leks between the two areas and confirmed through the information gleaned from the last 7 years of radio-telemetry data collected in the general vicinity. Results from that project have demonstrated that grouse are most commonly recorded in the eastern quarter of the 2-mile wildlife survey area for the North Porcupine LBA Tract, east of the Payne County Road. Detailed reports and long-term maps documenting grouse locations in the area have been submitted to WDEQ/LQD and other agencies in each study year.

Annual surveys for sage-grouse broods were conducted in native and reclaimed stream channels at the North Antelope Rochelle Mine and adjacent mines from 1994 through 1999; such surveys were no longer required by WGFD and WDEQ/LQD after that year due to the consistent lack of grouse broods observed at coal mines throughout the PRB. Likewise, no sage-grouse broods were seen during recent baseline inventories conducted for the North and South Porcupine LBA Tracts. All grouse broods that have been recorded over the years occurred as incidental sightings during other wildlife surveys.

Nesting and winter surveys for sage-grouse are not required as part of the annual wildlife programs for the North Antelope Rochelle or the other applicant mines included in this EIS (Black Thunder and Jacobs Ranch), though winter surveys have been conducted as part of baseline inventories for previous mine expansions. Additionally, winter surveys for other species (big game and bald eagle roosts) have occurred at all three of these mines in recent years. Due to their proximity to existing mine permit areas, nearly all of the combined North and South Porcupine tracts' general analysis areas have been included in some level of regular (but not always annual) winter surveys since 1987. No sage-grouse were ever documented in or near these two LBA tracts during those surveys. However, grouse have been confirmed as year-round residents in the vicinity of the North Porcupine tract general analysis area during year-round telemetry studies conducted from 2001 through 2005, with less frequent

monitoring during the subsequent two winters. Only isolated grouse sightings occurred within 3 miles of the South Porcupine tract general analysis area during that telemetry monitoring period, with each sighting limited to a single observation per bird.

Existing Conditions – South Porcupine LBA Tract

As described previously, USFS lands on the general analysis area for the South Porcupine LBA Tract are dominated by various native and introduced grassland species. The North Antelope Rochelle Mine, as part of its wildlife monitoring program from 1984 through 1992, conducted voluntary searches for and annual monitoring of sage-grouse leks throughout the mine's original permit area and a 1-mile perimeter. Those surveys became mandatory with the implementation of Appendix B of the WDEQ/LQD Coal Rules and Regulations in 1993, and continued each year through 2007. Radio-telemetry data gathered from grouse collared at the North Antelope Rochelle Mine during a voluntary, multi-year (2001 through 2007) study have demonstrated that most birds in the North and South Porcupine LBA Tracts' 2-mile wildlife survey areas (Figures H-4 and H-5) reside near the mine year-round. Additional details describing the survey and monitoring efforts for sage-grouse at the North Antelope Rochelle Mine are available in annual wildlife monitoring and baseline wildlife reports on file at the USFS Douglas Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne.

No sage-grouse leks have been documented on or within 3 miles of the South Porcupine tract's general analysis area (Figure H-5). The Payne lek, which is nearly 5 miles to the northeast, is the closest sage-grouse lek to the South Porcupine tract's general analysis area.

Although sage-grouse numbers have generally been low in the combined North and South Porcupine tracts' wildlife survey areas over the years, known or potential grouse habitat is present in both areas. However, the most suitable sage-grouse habitat exists in the North Porcupine area, as suggested by the distribution of grouse leks between the two areas and confirmed through the information gleaned from the last 7 years of radio-telemetry data collected in the general vicinity. Results from that project have demonstrated that grouse are most commonly recorded in the eastern quarter of the 2-mile wildlife survey area for the North Porcupine LBA Tract, east of the Payne County Road. Detailed reports and long-term maps documenting grouse locations in the area have been submitted to WDEQ/LQD and other agencies in each study year.

Annual surveys for sage-grouse broods were conducted in native and reclaimed stream channels at the North Antelope Rochelle Mine and adjacent mines from 1994 through 1999; such surveys were no longer required by WGFD and WDEQ/LQD after that year due to the consistent lack of grouse broods observed at coal mines throughout the PRB. Likewise, no sage-grouse broods were seen during recent baseline inventories conducted for the North and

South Porcupine LBA Tracts. All grouse broods that have been recorded over the years occurred as incidental sightings during other wildlife surveys.

Nesting and winter surveys for sage-grouse are not required as part of the annual wildlife programs for the North Antelope Rochelle or the other applicant mines included in this EIS (Black Thunder and Jacobs Ranch), though winter surveys have been conducted as part of baseline inventories for previous mine expansions. Additionally, winter surveys for other species (big game and bald eagle roosts) have occurred at all three of these mines in recent years. Due to their proximity to existing mine permit areas, nearly all of the combined North and South Porcupine tracts' general analysis areas have been included in some level of regular (but not always annual) winter surveys since 1987. No sage-grouse were ever documented in or near these two LBA tracts during those surveys. However, grouse have been confirmed as year-round residents in the vicinity of the North Porcupine general analysis area during year-round telemetry studies conducted from 2001 through 2005, with less frequent monitoring during the subsequent two winters. Only isolated grouse sightings occurred within 3 miles of the South Porcupine general analysis area during that telemetry monitoring period, with each sighting limited to a single observation per bird.

Direct and Indirect Effects – North, South and West Hilight Field LBA Tracts

Three of the five sage-grouse leks located in the combined wildlife survey areas for the three Hilight Field LBA Tracts occur in an area likely to be disturbed by future mining, if the three proposed leasing actions are approved. One lek (Stuart II in the West Hilight Field tract's general analysis area) is on USFS lands and the other two (Hansen Lakes and Butch) are on non-federal surface in the North Hilight Field tract's general analysis area.

Due to the consistently low number of sage-grouse documented in these LBA tracts' wildlife survey areas over the last 3 decades, despite the presence of apparently suitable habitat, leasing and mining USFS lands and adjacent lands within the general analysis areas for the North, South, and West Hilight Field LBA Tracts would have limited effects on individual birds. Some potential impacts of mineral development (including coal mining and oil and gas development) on sage-grouse that might inhabit the area, as well as on known and potential sage-grouse habitat include: alteration of plant and animal communities; loss or degradation of important seasonal habitats; increased human activity and noise which could cause animals to avoid the area and/or reduce their breeding efficiency; increased road traffic and related injuries or mortalities; increased risk of predation from raptors perched on existing or future power poles and/or grouse avoidance of areas with overhead power lines; potential illegal harvest; and reduced water tables resulting in the loss of herbaceous vegetation. Following reclamation, there may be a long term loss of nesting and winter habitat, depending on the amount of sagebrush that is restored relative to the amount of sagebrush that is present before mining. Sagebrush is a component of both the Sagebrush/Grassland and Big

Sagebrush vegetation communities, which occupy approximately 55 to 60 percent of the combined vegetation analysis areas for the three Hilight Field LBA Tracts. WDEQ/LQD reclamation standards call for restoration of sagebrush on at least 20 percent of the reclaimed area. Estimates for the time it would take to restore shrubs, including sagebrush, to pre-mining density levels range from 20 to 100 years. Until sagebrush returns to its pre-mining density levels, a reduction in potential sage-grouse nesting habitat and winter habitat on the three Hilight Field LBA Tracts would persist.

Due to the documented long-term lack of sage-grouse use on USFS lands and adjacent lands in the North, South, and West Hilight Field tracts' general analysis areas and surrounding wildlife survey areas, USFS Standards and Guidelines (USFS 2002, page 1-18; Appendix D) would have limited applications toward controlling the type, timing, and location of disturbance activities within the three Hilight Field LBA Tract areas. The use of existing roads, when possible, could minimize additional impacts related to traffic hazards and the use of new travel corridors by mammalian predators. Raptor predation does not seem to be a primary source of mortality for the local sage-grouse population (Brown and Clayton 2004). Nevertheless, new overhead power lines could be fitted with perch deterrents to limit opportunities for avian predators to target any grouse that might be in the area. The use of underground power lines to the extent possible would also reduce this risk, and would minimize new vertical structures that could affect grouse use or movements in the area. If precautions are taken to avoid direct mortalities and disturbances to nests and leks during the breeding season, grouse might have the opportunity to disperse away from mine activities.

Mine operations and oil and gas development have requirements for reclamation of disturbed areas as recovery of energy resources is completed. Those reclamation efforts can work in concert with Standards and Guidelines toward mitigating impacts to wildlife species and habitats, though reclamation standards are widely variable among industries. New areas disturbed by mining in the general analysis areas for the three Hilight Field LBA Tracts will be reclaimed incrementally, but they may not be attractive to sage-grouse for many years due to slow establishment and growth rates of important sagebrush species. Information gleaned from the multi-year telemetry study at a neighboring coal mine could also be helpful in reclamation efforts for the three Hilight Field LBA Tracts. In the meantime, the presence of known and apparently suitable sage-grouse habitat elsewhere within the immediate area could provide alternate areas for dispersing grouse to use until reclaimed sagebrush stands have matured adequately to support a local population.

In keeping with the Direction Objectives for the Hilight Bill Geographic Area (USFS 2002, page 1-25), impacts to sage-grouse habitat in the general analysis areas for the three Hilight Field LBA Tracts could be further mitigated off-site by efforts to preserve and enhance habitat on adjoining and nearby private lands, such as those currently under way through the Thunder Basin Grasslands Prairie Ecosystem Association. Management planning and

processes that are developed through this combined effort among landowners and federal representatives will presumably provide suitable habitat for sage-grouse that disperse from the three Hilight Field LBA Tracts general analysis areas during the interim between habitat disturbance and completed reclamation.

Should sage-grouse move onto USFS lands analyzed in this EIS in the future, agency Standards and Guidelines would offer appropriate protections for the species and its important habitats. However, under the current conditions, and the documented absence or consistently low presence of this species in the area, mining USFS lands within the North, South, and West Hilight Field LBA Tracts would not adversely impact sage-grouse populations in the region, nor would it conflict with the current TBNG Plan or any future objectives to manage the area for this species.

Direct and Indirect Effects – North Porcupine LBA Tract

Because of their location within the existing permit area for the North Antelope Rochelle Mine, all five sage-grouse leks in the North Porcupine tract's wildlife survey area occur in an area likely to be disturbed by future mining, regardless of whether the proposed leasing action is approved.

Some potential impacts of mineral development (including coal mining and oil and gas development) on sage-grouse that might inhabit the general analysis area for the North Porcupine tract, as well as on known and potential sage-grouse habitat include: alteration of plant and animal communities; loss or degradation of important seasonal habitats; increased human activity and noise, which could cause animals to avoid the area and/or reduce their breeding efficiency; increased road traffic and related injuries or mortalities; increased risk of predation from raptors perched on existing or future power poles and/or grouse avoidance of areas with overhead power lines; potential illegal harvest; and reduced water tables resulting in the loss of herbaceous vegetation. Following reclamation, there may be a long-term loss of nesting and winter habitat, depending on the amount of sagebrush that is restored relative to the amount of sagebrush that is present before mining.

Sagebrush communities occupy approximately 54 percent of the vegetation analysis areas in the North Porcupine LBA Tract. Mine operations and oil and gas development have requirements for reclamation of disturbed areas as recovery of energy resources is completed. WDEQ/LQD reclamation standards for surface coal mines call for restoration of sagebrush on at least 20 percent of the reclaimed area. Those reclamation efforts can work in concert with USFS Standards and Guidelines toward mitigating impacts to wildlife species and habitats. New areas disturbed by mining in the general analysis area for the North Porcupine LBA Tract would be reclaimed incrementally, but they may not be attractive to sage-grouse for many years due to slow establishment and growth rates of important sagebrush species. Information gleaned from the multi-year telemetry study at the North Antelope Rochelle Mine would be

incorporated into reclamation efforts for the LBA tract to maximize successful reclamation of sage-grouse habitat. Estimates for the time it would take to restore shrubs, including sagebrush, to pre-mining density levels range from 20 to 100 years. Until sagebrush returns to its pre-mining density levels, a reduction in potential year-round sage-grouse habitat within the North Porcupine tract's general analysis area would persist. In the meantime, the presence of known and apparently suitable sage-grouse habitat elsewhere within the immediate area could provide alternate areas for dispersing grouse to use until reclaimed sagebrush stands have matured adequately to support a local population.

In keeping with the Direction Objectives for the Hilight Bill Geographic Area (USFS 2002, page 1-25), impacts to sage-grouse habitat in the general analysis area for the North Porcupine LBA Tract could be further mitigated off-site by efforts to preserve and enhance habitat on adjoining and nearby private lands, such as those currently under way through the Thunder Basin Grasslands Prairie Ecosystem Association. Management planning and processes that are developed through this combined effort among landowners and federal representatives will presumably provide suitable habitat for sage-grouse that disperse from the North Porcupine tract and adjacent North Antelope Rochelle Mine areas during the interim between habitat disturbance and completed reclamation. Should sage-grouse move onto new USFS lands proposed for mining in the future, agency Standards and Guidelines would offer appropriate protections for the species and its important habitats.

Despite the impacts to the Rochelle lek complex, the proposed leasing action would not contribute to significant reductions in the regional sage-grouse population overall, nor would it conflict with the current TBNG Plan or any future objectives to manage the area for this species.

Direct and Indirect Effects – South Porcupine LBA Tract

No impacts to sage-grouse are expected for the South Porcupine area due to the documented lack of sage-grouse and suitable sage-grouse habitat in that area.

Some potential impacts of mineral development (including coal mining and oil and gas development) on sage-grouse that might inhabit the general analysis area for the South Porcupine tract, as well as on known and potential sage-grouse habitat include: alteration of plant and animal communities; loss or degradation of important seasonal habitats; increased human activity and noise which could cause animals to avoid the area and/or reduce their breeding efficiency; increased road traffic and related injuries or mortalities; increased risk of predation from raptors perched on existing or future power poles and/or grouse avoidance of areas with overhead power lines; potential illegal harvest; and reduced water tables resulting in the loss of herbaceous vegetation. Following reclamation, there may be a long-term loss of nesting

and winter habitat, depending on the amount of sagebrush that is restored relative to the amount of sagebrush that is present before mining.

Mine operations and oil and gas development have requirements for reclamation of disturbed areas as recovery of energy resources is completed. WDEQ/LQD reclamation standards for surface coal mines call for restoration of sagebrush on at least 20 percent of the reclaimed area. Those reclamation efforts can work in concert with USFS Standards and Guidelines toward mitigating impacts to wildlife species and habitats. New areas disturbed by mining in the South Porcupine tract's general analysis area would be reclaimed incrementally, but they may not be attractive to sage-grouse for many years due to slow establishment and growth rates of important sagebrush species. Information gleaned from the multi-year telemetry study at the North Antelope Rochelle Mine will be incorporated into reclamation efforts for the LBA tract to maximize successful reclamation of sage-grouse habitat. Estimates for the time it would take to restore shrubs, including sagebrush, to pre-mining density levels range from 20 to 100 years. Until sagebrush returns to its pre-mining density levels, a reduction in potential year-round sage-grouse habitat within the South Porcupine tract's general analysis area would persist. In the meantime, the presence of known and apparently suitable sage-grouse habitat elsewhere within the immediate area could provide alternate areas for dispersing grouse to use until reclaimed sagebrush stands have matured adequately to support a local population.

In keeping with the Direction Objectives for the Hilight Bill Geographic Area (USFS 2002, page 1-25), impacts to sage-grouse habitat in the North Antelope Rochelle Mine's permit area could be further mitigated off-site by efforts to preserve and enhance habitat on adjoining and nearby private lands, such as those currently under way through the Thunder Basin Grasslands Prairie Ecosystem Association. Management planning and processes that are developed through this combined effort among landowners and federal representatives will presumably provide suitable habitat for sage-grouse that disperse from the North Antelope Rochelle Mine area during the interim between habitat disturbance and completed reclamation. Should sage-grouse move onto new USFS lands proposed for mining in the future, agency Standards and Guidelines would offer appropriate protections for the species and its important habitats.

Despite the impacts to the Rochelle lek complex, the proposed leasing action would not contribute to significant reductions in the regional sage-grouse population overall, nor would it conflict with the current TBNG Plan or any future objectives to manage the area for this species.

Determination of Effect and Rationale – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the

planning area. The sage-grouse is a common year-round resident throughout much of the PRB and TBNG, but has declined on and within 2 miles of the general analysis areas for the North, South, and West Hilight Field LBA Tracts over the last 30 years. Three decades of regular monitoring have documented that sage-grouse have not consistently inhabited the USFS lands analyzed for the North or South Hilight Field LBA Tracts, nor have they been confirmed as occupying USFS lands analyzed for the West Hilight Field LBA Tract since 1991. Currently, the nearest lek (Payne lek) with regular activity is more than 5.0 miles to the southeast of the USFS lands in the South and West Hilight Field LBA Tracts. Consequently, if the North, South and West Hilight Field LBA Tracts are leased, anticipated mining-related disturbances would not affect any identified and actively used seasonal sage-grouse habitats on or near USFS lands in the combined general analysis areas for these three tracts. Annual monitoring will continue for the life of the Black Thunder Mine, and would include new permit expansions and a one-mile perimeter. Should sage-grouse be observed on USFS lands in any of the three Hilight Field LBA Tracts' wildlife survey areas, appropriate monitoring and mitigation measures would be implemented to minimize impacts to birds, habitats, and populations.

Determination of Effect and Rationale – North Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. More than 20 years of regular monitoring have documented that sage-grouse do inhabit USFS lands analyzed for the North Porcupine LBA Tract general analysis area. Currently, the Payne and Kort leks are the only sites with regular activity in recent years, with most birds seen at the Payne lek. Those leks have been used by an average peak count of 10.5 and 5.2 males per year, respectively, since they were discovered. Although impacts to the leks within the Rochelle complex will be detrimental to individual birds, that group represents only a small (4 to 17 percent) proportion of the sage-grouse population in the TBNG and Hilight Bill Geographic Area, respectively. Annual monitoring will continue for the life of the North Antelope Rochelle Mine, and will include new permit expansions and a 1-mile perimeter. Should additional sage-grouse leks or use areas be observed on USFS lands in the North Porcupine tract's wildlife survey area, appropriate monitoring and mitigation measures will be implemented to minimize impacts to birds, habitats, and populations.

Determination of Effect and Rationale – South Porcupine LBA Tract

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. More than 20 years of regular monitoring have documented that sage-grouse do not inhabit the grassland dominated South Porcupine LBA Tract general analysis area. Annual monitoring will continue for the life of the North Antelope Rochelle Mine, and will include new permit expansions and a one-mile perimeter. Should additional sage-grouse leks or use areas be observed on USFS lands in the South Porcupine tract's wildlife survey area,

appropriate monitoring and mitigation measures will be implemented to minimize impacts to birds, habitats, and populations.

### H-3.2.27 Bald eagle (Haliaeetus leucocephalus)

Bald eagles occur throughout North America, from Alaska and Canada south to Florida, the Gulf Coast, and northern Mexico. The northwest coast of North America serves as the stronghold for this species, with approximately one-half of the population inhabiting Alaska.

The USFWS officially listed the bald eagle as an endangered species in 43 of the lower 48 states on July 4, 1976. The listing was due to a combination of several factors, including widespread habitat loss, negative effects of pesticide use on reproductive success, indiscriminant shooting, and others. The status of the bald eagle was downgraded to threatened throughout the lower 48 states in 1995. Bald eagle population trends began increasing throughout most of the species' range in the early 1990's, and it was proposed for de-listing in 1999.

On July 9, 2007, USFWS published a Federal Register notice (72 FR 37346) announcing that the bald eagle would be removed from the list of threatened and endangered species under the Endangered Species Act of 1973, as amended (16 U.S.C 1531 *et* seq.) on August 8, 2007. However, the protections provided to the bald eagle under the Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. 668, and the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, will remain in place. The bald eagle is now recognized as a BLM and USFS Sensitive Species.

Bald eagles typically nest in large trees within a stand of mature, similarly sized trees either beside or in proximity (within 0.7 mile) to rivers, lakes, or reservoirs that harbor adequate fish populations. Those areas tend to be remote and experience little disturbance (Johnsgard 1990). Typically, the nest is placed in the crown of a large cottonwood or pine, but if the topography allows, eagles will nest on cliff edges or escarpments. Open-canopied trees and snags provide required perches in nesting and foraging areas.

All verified bald eagle nests in northeastern Wyoming (BLM Buffalo Field Office GIS database) are situated in significant, mature cottonwood stands along larger streams or rivers (i.e., Tongue River, Powder River, Clear Creek, and Little Thunder Creek). Nesting attempts are rare on the TBNG (Beske 1994). Fish and waterfowl are the primary source of food for nesting bald eagles. Where available, large to mid-size carrion and large rodents (e.g., prairie dogs) can also be an important dietary component.

Bald eagles nest and winter throughout Wyoming, though typically are not locally abundant in the northeastern portion of the state. The species regularly migrates through and winters in Campbell County (Cerovski et al. 2004), and has often been documented during winter and early spring at nearby coal mines (various coal mine annual reports are on file at the USFS Douglas

Ranger District Office in Douglas and/or with WDEQ/LQD in Cheyenne). Most eagles that migrate through or winter in Campbell County roost communally in stands of large ponderosa pine, along wooded cottonwood-riparian corridors, or in isolated stands of large trees. As water is scarce in that region, especially during winter, those birds likely forage widely for lagomorphs or carrion.

Existing Conditions – North, South and West Hilight Field LBA Tracts

The bald eagle is seasonally common and most frequently observed during the winter months. Bald eagles are relatively common winter residents and migrants in the PRB, but only rarely nest in that region. Potential bald eagle nesting and winter roosting habitat, being primarily scattered stands of mature cottonwood trees, are present on USFS and adjacent lands along Little Thunder Creek, which flows through the general analysis areas for the South and West Hilight Field LBA Tracts; no streams flow through the North Hilight Field tract's general analysis area.

In general, the combined wildlife survey areas for the three Hilight Field LBA Tracts do not contain unique or sizeable concentrated prey sources (e.g., fisheries, waterfowl wintering areas) that would be expected to attract bald eagles. As described in the North, South, and West Hilight Field LBA Tracts' black-tailed prairie dog analyses that are included within this appendix and in Section 3.10 of this EIS, two prairie dog colonies encompassing a total of approximately 89.2 acres were present on USFS lands within the three Hilight Field tracts' general analysis areas in 2007. A total of four prairie dog colonies encompassing approximately 112.1 acres were present in the three combined general analysis areas, and a total of 12 prairie dog colonies encompassing approximately 248.9 acres were present in the combined wildlife study areas for the three Hilight Field LBA Tracts in 2007 (Figures H-1, H-2 and H-3). Sheep and their lambs are present in this area in the spring, when bald eagles have typically left the region, and flocks are pastured there infrequently in the winter. The area does not support a large big game herd, though some groups do winter in the area.

Ground surveys for bald eagle winter roost sites were most recently conducted within the combined wildlife survey areas for the three Hilight Field tracts during baseline surveys beginning in 2006. Previous winter roost surveys also encompassed all or most potential habitat within that overall survey area. All winter roost surveys were conducted between ½ hour before and 1 hour after sunrise or between 1 hour before and ½ hour after sunset, per current BLM guidelines for survey timing and frequency. Biologists also watched for nesting bald eagles within the survey area while conducting surveys for other nesting raptors.

No bald eagle nests or winter roosts have been documented within 1 mile of USFS lands located within the North Hilight Field tract's general analysis area during any baseline or annual monitoring studies since they began in the late 1970s and early 1980s, respectively. Similarly, no bald eagle nests or winter

roosts have been documented within 1 mile of USFS lands located within the South Hilight Field tract's general analysis area during any baseline or annual monitoring studies since they began during those same timeframes.

The BLM and USFS wildlife databases indicate that the nearest potential bald eagle nest was identified in 2003 in T.43N., R.71W., NE¼NW¼ Section 29, which is in the southwestern corner of the West Hilight Field tract's general analysis area (Figure H-3). Although the nest has been labeled as a bald eagle site for that year, the circumstances of the sighting were less than definitive. The lone observation of the nest was made from approximately 1 mile away late in the nesting season, when young golden eagles are fully feathered except for their heads. It is possible that an inexperienced observer could have mistaken a young golden eagle for an adult bald eagle under those circumstances. Additionally, golden eagles were confirmed nesters at the same site location in both 2002 and 2004. Nevertheless, the site could be treated as a potential bald eagle nest for management purposes.

Existing Conditions – North and South Porcupine LBA Tracts

The bald eagle is seasonally common and most frequently observed during the winter months. Bald eagles are relatively common winter residents and migrants in the PRB, but only rarely nest in that region.

No bald eagle nests or winter roosts have been documented within 1 mile of USFS lands located within the general analysis areas for the North or South Porcupine LBA Tracts during any baseline or annual monitoring studies since they began in the late 1970s and early 1980s, respectively. Scattered stands of potential bald eagle nesting and winter roosting habitat (mature cottonwood corridors) are present on USFS and adjacent lands along Porcupine Creek as it flows through the general analysis area for the North Porcupine LBA Tract. No streams flow through the South Porcupine tract's general analysis area and few trees are present there.

In general, the combined wildlife survey areas for the two Porcupine LBA Tracts do not contain unique or sizeable, concentrated prey sources (e.g., fisheries, waterfowl wintering areas) that would be expected to attract bald eagles. As described in the North and South Porcupine LBA Tracts' black-tailed prairie dog analyses that are included within this appendix and in Section 3.10 of this EIS, no prairie dog colonies were present on USFS lands within either tract's general analysis area in 2007. Only one colony encompassing approximately 18.6 acres was present within the North Porcupine tract's general analysis area, and no colonies were present within the South Porcupine tract's general analysis area, in 2007. A total of 23 prairie dog colonies encompassing approximately 1,317 acres were present in the combined wildlife study areas for the two Porcupine LBA Tracts in 2007 (Figures H-4 and H-5). Sheep and their lambs are present in this area in the spring, when bald eagles have typically left the region, and flocks are pastured there infrequently in the

winter. The area does not support a large big game herd, though some groups do winter in the area.

Ground surveys for bald eagle winter roost sites were most recently conducted within the combined wildlife survey areas for the two Porcupine tracts during baseline surveys beginning in 2006. Previous winter roost surveys also encompassed all or most potential habitat within that overall survey area. All winter roost surveys were conducted between ½ hour before and 1 hour after sunrise or between 1 hour before and ½ hour after sunset, per current BLM guidelines for survey timing and frequency. Biologists also watched for nesting bald eagles within the survey area while conducting surveys for other nesting raptors.

Direct and Indirect Effects

As no winter roost sites or large groups of bald eagles have been documented in the general analysis area for any of the WAC LBA Tracts, potential impacts would be limited to occasional foraging individuals rather than a large segment of the population. The increased human presence and noise associated with construction activities, if conducted while eagles are wintering within the area, could harass or displace individual eagles during that period. Nesting eagles could also be distressed to the point of abandoning eggs or young, or their hunting efforts and success impacted. If necessary, the majority of direct effects could be mitigated by controlling the timing and location of disturbance activities, and/or through approved nest relocation efforts.

Indirect effects include additional disturbance and fragmentation of already limited foraging habitat within the geographic area. These impacts could result from a variety of large- and small-scale activities described previously for other species, including, but not limited to: topsoil stripping; overburden and coal removal; reclamation activities; and construction of roads, reservoirs, power lines (above ground and buried), fences, and pipelines. The locations of operations would shift throughout the expanded permit area as mining occurred, with habitats disturbed and reclaimed incrementally. Conversely, the addition of fences and raptor-safe power poles could possibly benefit foraging bald eagles by providing additional perch sites. Due to the limited presence of potential nesting or roosting sites, and lack of concentrated sources of prey, the direct and indirect effects of the Proposed Action and Alternative 2 for each LBA tract to bald eagles are expected to be minimal.

Determination of Effect and Rationale – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No bald eagle nests have been documented on or within 1 mile of the North or South Hilight Field LBA Tracts' general analysis areas, and only one dubious nesting event was recorded in the West Hilight Field LBA Tract's general analysis area over time. Bald eagle winter roost sites are absent from

all three Hilight Field LBA Tracts' wildlife survey areas, and little potential nesting or roosting habitat is present. Therefore, potential hazards for this species would be limited to foraging individuals during winter. Disturbance, fragmentation, and alteration of potential foraging habitat would occur. However, the Black Thunder Mine has avoided, where possible, and mitigated raptor impacts in the past through intensive raptor monitoring, implementation of USFWS approved mitigation measures, and adjusting operations to provide temporal and spatial buffers around raptor nests.

Determination of Effect and Rationale – North and South Porcupine LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. No bald eagle nests have been documented on or within 1 mile of the North or South Porcupine LBA Tract's general analysis area since annual monitoring began in the early 1980s. Potential bald eagle winter roost and nesting sites are limited in both LBA tract's wildlife survey area, and no reliable prey sources are present to support nesting or roosting bald eagles. Therefore, potential hazards for this species would be limited to foraging individuals during winter. Disturbance, fragmentation, and alteration of potential foraging habitat would occur. However, the North Antelope Rochelle Mine has avoided, where possible, and mitigated raptor impacts in the past through intensive raptor monitoring, implementation of USFWS approved mitigation measures, and adjusting operations to provide temporal and spatial buffers around raptor nests.

### H-3.2.28 Mountain plover (*Charadrius montanus*)

The mountain plover breeds from southeastern Alberta and southwestern Saskatchewan through central Montana, south to south-central Wyoming, east-central Colorado and northeastern New Mexico, and east to northern Texas and western Kansas. In Wyoming, this species is a common summer resident (Cerovski et al. 2004). Mountain plovers require flat grasslands with short and sparse vegetation, and a large bare ground component (Knopf 1996) for nesting, foraging, or staging. Within the PRB, heavily grazed prairie dog colonies generally provide the most suitable mountain plover habitat.

Mountain plovers are monogamous and possibly polyandrous ground nesters, and typically produce at least two clutches. The nest is a shallow depression occasionally thinly lined with grass. Plovers may utilize the same nesting area in subsequent years (Dechant et al. 2003d). Adults and fledged chicks leave the breeding grounds by early August, and may stage within appropriate habitats before migrating. Plovers feed primarily upon insects. Beetles, grasshoppers, crickets, and ants are the most important prey items (Knopf 1996). This species is highly approachable and does not flee far. Mountain plover populations have historically declined and recent data suggests that this species is continuing to decline in numbers. Causes of population declines have been primarily attributed to regional changes in agricultural practices (Knopf 1996).

Existing Conditions – North, South and West Hilight Field LBA Tracts

Mountain plovers are summer residents within portions of the TBNG. Most observations of mountain plovers in northeast Wyoming have been associated with prairie dog colonies. Approximately 86 percent of recently (since 1993) occupied mountain plover habitat in that region occurred within prairie dog colonies (Byer 2001). As described in the North, South, and West Hilight Field LBA Tracts' black-tailed prairie dog analyses that are included within this appendix and in Section 3.10 of this EIS, two prairie dog colonies encompassing a total of approximately 89.2 acres were present on USFS lands within the three Hilight Field tracts' general analysis areas in 2007. A total of four prairie dog colonies encompassing approximately 112.1 acres were present in the three combined general analysis areas, and a total of 12 prairie dog colonies encompassing approximately 248.9 acres were present in the combined wildlife study areas for the three Hilight Field LBA Tracts in 2007 (Figures H-1, H-2 and H-3).

As previously described for other short-grass species, the dominance of sagebrush in the North, South, and West Hilight Field LBA Tract's general analysis and wildlife survey areas provides only poor to marginal or unsuitable habitat for mountain plovers. The height and composition of vegetation on most USFS lands in the three Hilight Field tracts' general analysis areas is generally too tall and dense to provide suitable habitat for mountain plovers. The lack of occurrence of this species at the Black Thunder Mine and surrounding area, including all USFS lands in the analysis areas, is well documented. The nearest known population of nesting mountain plovers occurs at the Antelope Mine, approximately 9 miles south of the South Hilight Field tract's general analysis area, and even farther from the other two Hilight Field LBA Tracts.

Existing Conditions – North and South Porcupine LBA Tracts

Mountain plovers are summer residents within portions of the TBNG. Most observations of mountain plovers in northeast Wyoming have been associated with prairie dog colonies. Approximately 86 percent of recently (since 1993) occupied mountain plover habitat in that region occurred within prairie dog colonies (Byer 2001). Because of the similarity in habitat requirements between the mountain plover and McCown's longspur, similar existing conditions and impacts would apply for both species. The nearest known breeding population of mountain plovers occurs in a large prairie dog colony located at the Antelope Mine, approximately 4 miles southwest of the South Porcupine LBA Tract's general analysis area, and even farther from the North Porcupine LBA Tract.

As described above, sagebrush communities dominate the North Porcupine tract's general analysis area. Only one small (approximately 18.6 acres) prairie dog colony is present in that area, and it is located on non-federal lands. Generally, the vegetation in the North Porcupine tract's general analysis area and surrounding wildlife survey area is too tall and dense to attract mountain

plovers. The best potential habitat for this species occurs in a large (about 345.3 acres) occupied prairie dog colony immediately south of the North Porcupine tract's general analysis area (Figure H-4). Despite the presence of suitable habitat and the occurrence of annual monitoring in that area, mountain plovers have never been documented on USFS or adjacent lands within the North Porcupine tract's general analysis area.

Some portions of the grassland-dominated South Porcupine tract's general analysis area and surrounding area would be considered suitable mountain plover habitat, including both USFS and non-federal surface. The best potential habitat for this species occurs in the large (about 345.3 acres) occupied prairie dog colony that overlaps the wildlife monitoring area for both the North and South Porcupine LBA Tracts (Figures H-4 and H-5). Despite the presence of suitable habitat and the occurrence of annual monitoring in that area, mountain plovers have never been documented on USFS or adjacent lands within the South Porcupine tract's general analysis area.

Mountain plovers have been recorded in the combined North and South Porcupine tracts' wildlife survey areas only three times over the last 2 decades of annual monitoring. In mid-June 2004, single individuals were seen in short-grass areas on two separate days. One adult was observed on non-federal surface in the western portion of the South Porcupine tract's general analysis area. The second individual was recorded in the southwestern portion of the South Porcupine tract's wildlife survey area. Neither adult exhibited any defensive behavior, so both were presumed to be non-breeding birds. In early August 2005, a group of 15 to 20 mountain plovers was observed in the large (345.3 acres in size) prairie dog colony that overlaps both the North and South Porcupine tracts' wildlife survey areas. That group was presumed to be staging briefly during the fall migration. No other plover sightings have ever been recorded in that colony, despite survey efforts targeting that location.

Direct and Indirect Effects

Due to the similarit in their habitat associations, the direct and indirect effects to mountain plover in the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts would be the same as those described above for the McCown's longspur.

Determination of Effect and Rationale – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. USFS lands in the North, South, and West Hilight Field tracts' general analysis areas are dominated by sagebrush communities that are not attractive to short-grass species such as the mountain plover. No individuals of this species have been documented in any of the three Hilight Field tracts' general analysis areas, though limited potential habitat is present there. Documented alternative habitats for mountain plovers are present in portions

of the general area that are more appropriate for this species and are not currently scheduled for mining disturbance.

Determination of Effect and Rationale – North and South Porcupine LBA Tracts
Implementation of the Proposed Action or Alternative 2 *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Suitable plover habitat on USFS lands is limited primarily to a large prairie dog colony that overlaps the wildlife survey areas for both the North and South Porcupine LBA Tracts; no prairie dog colonies are present on USFS lands in either tract's general analysis area. Only one mountain plover has been documented in the general analysis area for either Porcupine LBA tract in more than 20 years of annual monitoring. Documented alternative habitats for mountain plovers are present elsewhere in the region that is not currently scheduled for mining disturbance.

### H-3.2.29 Loggerhead shrike (*Lanius ludovicianus*)

Loggerhead shrikes breed from Washington, northern Alberta, central Saskatchewan, and southern Manitoba, south to California and Florida, and east to southwestern Minnesota, southern Wisconsin, southern Michigan, and Maryland. This species is a common summer resident throughout Wyoming (Cerovski et al. 2004). Shrikes prefer relatively open, heterogeneous habitats characterized by grasses and forbs of low stature interspersed with bare ground and shrubs or low trees with perches for hunting. This species will use a wide variety of trees and shrubs, particularly thick or thorny species, as nesting substrates and hunting perches (Prescott and Bjorge 1999).

Although some shrike nests are used in subsequent years, fidelity to a nest site is limited. This species forages over relatively open habitats, feeding primarily upon arthropods, amphibians, small to medium-sized reptiles, small mammals, and birds (Yosef 1996). Shrikes may also feed upon road kill and carrion. This species is generally tolerant of human activity near a nest, although they will abandon if disturbed during egg-laying or early in incubation. The loggerhead shrike is declining in both number and overall range. Declines have been attributed to habitat loss and conversion, urbanization, pesticide contamination, and loss of insect prey as a result of pesticide use (Yosef 1996).

Existing Conditions – North, South and West Hilight Field LBA Tracts
Loggerhead shrikes are common summer residents within the TBNG, though they are not often observed on or adjacent to USFS lands within the North, South and West Hilight Field LBA Tracts. Shrikes have occasionally been seen in the 1-mile perimeter wildlife survey area for the adjacent Black Thunder Mine, which overlaps significant portions of USFS lands in the South Hilight Field tract's general analysis area. No actual shrike nests or recently fledged young have been documented on or near USFS lands in the general analysis areas for the North, South and West Hilight Field LBA Tracts, but this species could potentially nest in the general vicinity. Over time, most sightings have occurred in cottonwood-riparian corridors along primary streams in the general

Wright analysis area, or in taller greasewood stands. Neither habitat type is common in the general analysis areas for the North, South and West Hilight Field LBA Tracts. Shrikes have also been infrequently recorded perched on various fences or on overhead power lines at other nearby mines. Shrike foraging habitat is present throughout the North, South and West Hilight Field tracts' general analysis areas, including USFS lands. As indicated, existing utility and fence lines currently provide good quality hunting perches.

Existing Conditions – North and South Porcupine LBA Tracts

Loggerhead shrikes are common summer residents within the TBNG. This species has occasionally been observed in a small tree windbreak at an old homestead site located adjacent to the general analysis areas for the North and South Porcupine tracts on USFS lands in T.42N., R.71W., SW¼SE¼ Section 35 (Figures H-4 and H-5). The presence of young indicates that shrikes have nested in that windbreak at least once. Few other trees or other nesting habitats are present elsewhere in the North and South Porcupine tracts' wildlife survey areas, as described previously for the bald eagle. Shrikes have also been infrequently recorded perched on various fences or on overhead power lines elsewhere in the tracts' wildlife survey areas. Shrike foraging habitat is present throughout the North and South Porcupine LBA Tracts' general analysis areas, including USFS lands. As indicated, existing utility and fence lines currently provide good quality hunting perches.

Direct and Indirect Effects – North, South and West Hilight Field LBA Tracts

Implementation of the Proposed Action or Alternatives could result in direct and indirect impacts to loggerhead shrikes, though such impacts would likely be uncommon. No known nest sites have been documented on or adjacent to USFS lands in the North, South and West Hilight Field tracts' general analysis areas or elsewhere in the wildlife monitoring area for the adjacent Black Thunder Mine. The most probable direct impact would be the mortality of, or injury to, individuals foraging within or passing through the USFS lands due to collisions with future mine-related vehicles, or dispersal of foraging individuals due to active mining.

The relatively slow movement of mining equipment and the noise associated with the activity would decrease direct impacts associated with vehicle collisions. As loggerhead shrikes are not especially common in the North, South and West Hilight Field tracts' general analysis areas, indirect impacts would be limited despite the fragmentation, degradation, or loss of habitat in the short and mid-term. Any birds that would be displaced would be forced to travel to other locations with acceptable habitat. This could result in stress to individual birds, as well as potential decreased nesting effort and success. Prey numbers reduced by mining would be expected to rebound following reclamation due to generally high reproductive potential and prey tendencies to re-establish and adapt to disturbed and reclaimed areas. The locations of mine-related habitat disturbances and reclamation efforts would proceed incrementally throughout the expanded mining area as operations progressed.

Additionally, this mining activity would not conflict with the current TBNG Plan, or any future objectives to manage the TBNG for this species. USFS Standards and Guidelines would offer additional protections for any active nest sites that may be present in the area.

Direct and Indirect Effects – North and South Porcupine LBA Tracts

Implementation of the Proposed Action or Alternatives could result in direct and indirect impacts to loggerhead shrikes, though such impacts would likely be uncommon. Only one presumed nest site has been documented on or adjacent to USFS lands or elsewhere in the wildlife survey areas for the North and South Porcupine LBA Tracts; that site is just outside of the tracts' general analysis areas, but is within the existing mine permit area for the North Antelope Rochelle Mine. The most probable direct impact would be the mortality of, or injury to, individuals foraging within or passing through the USFS lands due to collisions with future mine-related vehicles, or dispersal of foraging individuals due to active mining.

The relatively slow movement of mining equipment and the noise associated with the activity would decrease direct impacts associated with vehicle collisions. As loggerhead shrikes are not especially common in the North and South Porcupine tracts' general analysis areas, indirect impacts would be limited despite the fragmentation, degradation, or loss of habitat in the short and mid-term. Any birds that would be displaced would be forced to travel to other locations with acceptable habitat. This could result in stress to individual birds, as well as potential decreased nesting effort and success. Prey numbers reduced by mining would be expected to rebound following reclamation due to generally high reproductive potential and prey tendencies to re-establish and adapt to disturbed and reclaimed areas. The locations of mine-related habitat disturbances and reclamation efforts would proceed incrementally throughout the expanded mining area as operations progressed. Additionally, this mining activity would not conflict with the current TBNG Plan, or any future objectives to manage the TBNG for this species. USFS Standards and Guidelines would offer additional protections for any active nest sites that may be present in the area.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Such impacts would be minimized by the lack of regular sightings and known nesting attempts, as well as the relative paucity of suitable nesting habitat on or adjacent to the USFS lands analyzed in this EIS and their surrounding region. Degradation, fragmentation, or loss of potential foraging habitat, reduction in prey populations, and potential collisions with vehicles may occur. Given the lack of birds recorded in the area, and the composition of the shrike's prey base (insects, small mammals, etc.), impacts to shrikes would be minimal. USFS Standards and Guidelines would apply for active nests during the breeding season. Additionally, mining

the USFS lands would not conflict with the current TBNG Plan, or any future objectives to manage the TBNG for loggerhead shrikes.

### H-3.2.30 Brewer's sparrow (*Spizella breweri*)

The breeding range of the Brewer's sparrow extends from southwestern Yukon, southern Alberta, and southwestern Saskatchewan, south (east of the Cascades and Sierras) to southern California, central Arizona, and northern New Mexico (Rotenberry et al. 1999). The Brewer's sparrow is a common summer resident of the basin-prairie and mountain-foothills throughout Wyoming (Cerovski et al. 2004). Brewer's sparrow is a sagebrush obligate species (Rotenberry et al. 1999).

This species is an uncommon cowbird (*Molothrus ater*) host and typically builds a small cup nest low in sagebrush shrubs. Brewer's sparrows prefer to nest in medium-sized (48-90 centimeters, or 19-35 inches) live sagebrush within relatively dense (26-42 percent canopy cover) stands (Walker 2004). Grass height and density are important factors for nest concealment. Although tolerant of human visitation, this species may abandon a nest if disturbed during the construction process.

Brewer's sparrows feed primarily on small insects and, to a lesser extent, seeds from grasses and forbs. Throughout areas where they have been surveyed, the species appears to have undergone and continues to undergo statistically significant declines (Rotenberry et al. 1999). Major threats to Brewer's sparrow populations are similar to those faced by other declining sagebrush-obligate species and include habitat conversion and fragmentation, invasion by non-native plants, altered fire regimes, livestock overgrazing, conifer encroachment, energy development, and conversion to urban or residential housing (Walker 2004).

Existing Conditions – North, South and West Hilight Field LBA Tracts

Brewer's sparrows are common summer residents within the TBNG and southern Campbell County (Cerovski et al. 2004). Breeding bird survey data from annual monitoring and baseline studies conducted for the Black Thunder Mine, as well as incidental observations over time, have shown that the Brewer's sparrow is a common but limited breeder in the area. This species is commonly observed and has been recorded in sagebrush habitats in the general Wright analysis area during many years of surveys. Although no nests have been encountered in the general analysis areas for the North, South and West Hilight Field LBA Tracts, the presence and behavior (singing) of birds throughout spring and summer suggest that Brewer's sparrows nest in the sagebrush stands common to those areas.

Existing Conditions – North and South Porcupine LBA Tracts

Brewer's sparrows are common summer residents within the TBNG and southern Campbell County (Cerovski et al. 2004). Breeding bird survey data from annual monitoring and baseline studies conducted for the North Antelope

Rochelle Mine, and incidental observations over time, have shown that the Brewer's sparrow is a common but limited breeder in the area. This species has been recorded during many years of surveys in sagebrush habitats within and near the North Porcupine LBA Tract, but no Brewer's sparrows have been recorded in the grassland-dominated general analysis area for the South Porcupine LBA Tract. Although no nests have been encountered, the presence and behavior (singing) of birds throughout spring and summer suggest that Brewer's sparrows nest in the sagebrush stands common to the tract's general analysis area.

Direct and Indirect Effects

Habitat loss, degradation, and fragmentation of sagebrush communities in the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field and North Porcupine LBA Tracts would result from a variety of mining operations such as topsoil stripping, drilling, and reservoir construction, among others. Potential nesting and foraging habitat would also be fragmented by linear disturbances such as the construction, maintenance, and removal of roads, fences, power lines, and pipelines. Those disturbances could also create new travel corridors for mammalian predators that reside in or pass through the area. However, many such disturbances would occur within narrow corridors over relatively short distances, typically over a period of days. Additionally, those structures are often constructed immediately prior to the removal of similar features elsewhere in the area, often resulting in minimal or no net gain of new linear disturbances. All habitat disturbances and reclamation efforts would shift throughout the expanded area of mining operations.

The use of existing roads, when possible, could minimize impacts related to traffic hazards and predator travel corridors. Increased activity and noise, especially during the nest initiation period, could inhibit nesting proximate to mining activities. Foraging could also be hindered within these areas, especially where active mining occurs. Additional infrastructure and activity associated with the expansion of the mine, in combination with other ongoing disturbances (e.g., CBNG operations), could displace Brewer's sparrows from any historical use areas that might occur in the area. Those birds could potentially move into other sagebrush stands in the general vicinity, assuming they are not already occupied.

Reclamation of disturbed areas will occur incrementally as mining is completed in a given portion of the mine and will eventually mitigate impacts to sagebrush habitats to some degree, though such efforts could take decades to benefit sagebrush obligates such as the Brewer's sparrow. Impacts to sagebrush habitat on USFS lands could be further mitigated off-site by efforts to preserve and enhance such habitat on adjacent and nearby private lands, as described above. Standards and Guidelines for sagebrush habitats outlined in the TBNG Plan (USFS 2002, pages 1-18; Appendix D) would be implemented as necessary, and could serve to sustain regional populations of this sparrow. Those management guidelines would apply only to activities beyond the North

Hilight Field, South Hilight Field, West Hilight Field, and North Porcupine LBA Tracts.

No impacts to Brewer's sparrows are expected in the genral analysis area for the South Porcupine tract due to the documented lack of sparrows and suitable sparrow habitat in that area.

Determination of Effect and Rationale

Implementation of the Proposed Action or Alternative 2 for each LBA tract *may impact individuals but is not likely to cause a trend to federal listing or loss of viability* within the planning area. Some habitat loss, degradation, and fragmentation would occur on and near USFS lands in the general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine and South Porcupine LBA Tracts, along with potential impacts to individuals. However, the presence of large stands of sagebrush elsewhere in the general vicinity suggests that Brewer's sparrows would remain viable within the TBNG for at least the short-term. Additionally, the Proposed Action or Alternative 2 for each LBA tract would not conflict with the current TBNG Plan (USFS 2002) or future objectives to manage the area for this species. Application of appropriate USFS Standards and Guidelines, successful reclamation efforts, and proper land management on adjoining lands could mitigate potential impacts, to some degree.

## H-4.0 CUMULATIVE EFFECTS REGARDING SENSITIVE SPECIES

Cumulative effects are defined under the National Environmental Policy Act of 1969 (NEPA) process as the incremental impacts of past, present, and reasonably foreseeable future actions conducted by any entity (federal, state, private, and others).

Cumulative short- and long-term disturbances to the species considered in this analysis arise from multiple sources that occur on federal and non-federal lands within the general Wright analysis area, including USFS lands within that area and neighboring lands. Those sources include direct and indirect impacts of mining (with an anticipated life of at least 20 more years), extraction of conventional oil and gas and CBNG reserves, road development and relocation, construction and removal of power lines and pipelines, grazing (livestock and wildlife), drought, occupied residences, and hunting and trapping. Those activities have occurred in the vicinity of the general Wright analysis area in the past and most are expected to continue at similar levels, at least for the near future.

Coal mining and CBNG development are expected to occur at an increased rate in the future. Other reasonable and foreseeable developments within the area could potentially include the construction of a coal-fired power plant and new rail lines for transporting coal. Both mining and oil and gas development activities have requirements for reclamation of disturbed areas as resources are depleted. However, those standards are dramatically different in both

implementation and monitoring. As new areas of disturbance related to energy extraction activities are added, areas that have been mined out will be restored and reclaimed. Similarly, oil and gas well sites will be reclaimed once they are depleted and abandoned.

No critical habitat for any USFS Sensitive Species has been delineated in the general Wright analysis area (including the USFS lands). Any habitat losses that do occur will eventually be mitigated for most species by reclamation with native seed mixes, which may improve habitat quality by reducing the presence of non-native plants (e.g., crested wheatgrass) within the area. Leasing lands within the general Wright analysis area will not conflict with the current TBNG Plan, or any future objectives to manage USFS lands and provide habitat for sensitive species. Because effects of disturbance on sensitive species inhabiting the same habitat types would be the same, cumulative impacts are analyzed according to species' main habitat associations.

## H-4.1 Species Associated Primarily With Short Grasses or Prairie Dog Colonies

Five evaluated species are strongly associated with prairie dog colonies or other areas with short, sparse vegetation: the black-tailed prairie dog, mountain plover, burrowing owl, chestnut-collared longspur, and McCown's longspur. Cumulative impacts to these habitats and associated species will largely result from activities that would decrease occupied black-tailed prairie dog colonies within the area. As the prairie dog is the most common sensitive species in the area, it has the most potential to be affected by cumulative impacts from the Proposed Actions and Alternatives. Specifically, individuals could be killed or injured by activities in or near prairie dog colonies, and habitat would be lost until reclamation takes place. Incremental habitat disturbance and freshly turned soil in stripped and reclaimed areas would allow escaping or dispersing animals to create new burrows, and thus maintain a presence in the area.

Burrowing owls and mountain plovers rely heavily on prairie dogs to provide and maintain suitable nesting habitat. Longspurs are also often found in prairie dog colonies in the overall general Wright analysis area. Therefore, any activities that jeopardize prairie dogs will also affect those species to some degree. Although impacts would occur on approximately 148.6 acres of prairie dog colonies that are currently located within the combined general analysis areas for the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts (108.1 acres of which occur on or within one-quarter-mile of USFS lands), the presence of approximately 1,490.6 total acres of colonies that currently exist on and within 2 miles of the six combined general analysis areas would minimize negative impacts to those three species. Despite their strong association with prairie dogs, species such as burrowing owls, mountain plovers, and longspurs can all utilize short-grass habitats other than prairie dog colonies. However, all of those avian species would benefit from the presence of undisturbed prairie dog

colonies surrounding the six combined general analysis areas, including USFS lands, as well as other short-form vegetative communities.

Despite the presence of additional habitat outside the six combined general analysis areas, cumulative effects expected for these five species would include habitat destruction, alteration, and fragmentation. As indicated, some individuals may be killed or injured by vehicles or equipment, collisions with fences, and poisoning or shooting. Predation rates on some species may increase due to the creation of favorable habitats, perches, or travel corridors for avian or mammalian predators. Nests of avian species will likely be destroyed or compromised by human disturbances or activities, and individuals (especially avian species) will likely be displaced from existing territories. Such occurrences would increase competition for available adjacent territories. If those areas have already reached carrying capacity, the result would be intra-specific competition followed by nutritional stress, decreased fecundity, and/or mortality.

### H-4.2 Mixed Sagebrush and/or Mid-grass Species

Mid-grass parcels interspersed with sagebrush commonly occur in the general Wright analysis area, including USFS lands. Mining in the area would impact the sagebrush shrubland/mixed prairie grassland habitats that are present. Evaluated species for mixed grassland habitats included the swift fox, long-billed curlew, and ferruginous hawk. Cumulative impacts to those species would be the similar to those described above. However, as all of these species have the capacity of utilizing a variety of habitats, including prairie dog colonies and short-grass areas, beyond the overall general Wright analysis area, the cumulative effects would be somewhat lessened.

Regarding the swift fox and ferruginous hawk, the fragmentation, alteration, or destruction of suitable habitats would also destroy denning and shelter sites or nest sites, respectively, and would potentially facilitate inter-specific competition for available prey bases. Both the swift fox and hawks using these habitats would also be negatively affected by activities that reduce prey availability. The impacts would be partially mitigated by the existing presence of alternate denning and nesting sites in the area that would not be disturbed by the Proposed Actions or Alternatives. The greatest threat to mixed sagebrush and/or mid-grass species would arise from the creation of habitat patches that are too small to attract individuals or sustain viable breeding pairs or populations.

### H-4.3 Sagebrush Obligates

Species associated with sagebrush habitats that could occur in or near the general Wright analysis area and associated USFS lands include the Greater sage-grouse and Brewer's sparrow. However, more than 25 consecutive years of monitoring have demonstrated that the sagebrush stands within most of this area are insufficient in size and structure to provide optimum sage-grouse

habitat. However, due to the total combined acreage of big sagebrush shrubland that would be disturbed by mining the six combined general analysis areas (approximately 18,330 total acres), sage-grouse would likely experience cumulative impacts by the Proposed Actions or Alternatives. Similarly, the relatively small and somewhat sparse shrub stands within the general analysis areas for these six LBA tracts provide limited, marginal nesting habitat for Brewer's sparrows.

Given the widespread occurrence of sagebrush habitat within the overall general Wright analysis area (including USFS lands), cumulative impacts to sagebrush habitats and their associated species would occur as a result of leasing and mining these six LBA tracts under the Proposed Actions or Alternatives. Direct impacts would likely be limited to the injury or mortality of individual sage-grouse and Brewer's sparrows, or their nests or young. Indirect impacts to the sagebrush-dependant species could entail changes in their presence or distribution as the quantity and quality of existing sagebrush stands in the area are diminished due to habitat fragmentation, alteration, degradation, and conversion of shrubland communities during ongoing and new mining operations.

Any displaced individuals would have to compete for the limited availability of adjacent territories, and if those areas have reached carrying capacity, intra-specific competition may result in nutritional stress, decrease in fecundity, or mortality to affected individuals. Sagebrush habitats lost to mining would be mitigated, as required. However, those efforts would not likely be able to keep pace with, or compensate for, the on-going loss or alteration of sagebrush habitat within the area, as sagebrush stands can take two or three decades to re-establish.

### H-4.4 Tree or Wetland/Aquatic Species

Within the general Wright analysis area, trees are found primarily in a few shelterbelts/windbreaks planted adjacent to widely scattered ranching facilities. Very few other trees are present due to the lack of water and suitable habitats. Approximately 602 acres of wetlands and other waters of the U.S. have been identified within the combined general analysis areas for these six LBA tracts, which provide wetland/aquatic habitats on and near USFS lands. Species associated with treed or aquatic habitats that could occur in or near those areas include the loggerhead shrike and northern leopard frog, though the latter is less likely to be present. Cumulative effects to shrikes would be similar, but slightly greater than, those for non-raptor avian species within mixed mid-grass and shrub habitats. The increased intensity of effects would be due to the overall lack of trees (potential nest sites), and thus the limited alternate habitats as trees are lost to mining. Mitigating that impact is the fact that detailed tree inventories would be conducted prior to all mining disturbances, as required by state and federal agencies, so that every tree that is lost to mining would be replaced during final reclamation. High intensity activity and noise when mining is most proximate along stream corridors where

native trees occur could deter shrikes from nesting in the area, at least until they acclimated to the disturbance. All trees destroyed by mining will be replaced during reclamation, but it will take decades for them to mature to their current stature.

Northern leopard frogs are not prevalent within either the general Wright analysis area or associated USFS lands, and therefore have little potential to be affected by cumulative impacts from the Proposed Actions and Alternatives. Wetland and aquatic habitats for northern leopard frogs are considered very poor to unsuitable on USFS lands within the combined general analysis areas for these six LBA tracts, and no frog sightings have been recorded on USFS lands within these areas. If this species is present in the future, individuals could be killed or injured by activities in proximity to aquatic habitats. Dewatering or degradation of breeding habitats could kill eggs, tadpoles, or over-wintering adults, as well as increase predation rates on adults and eggs. Conversely, the creation and augmentation of aquatic habitats for sedimentation ponds and other purposes could maintain and possibly increase local northern leopard frog populations. There would be no net loss of jurisdictional wetlands, as they would be restored under the jurisdiction of the U.S. Corps of Engineers (refer to Section 3.7 of this EIS). Non-jurisdictional and functional wetlands would be restored in accordance with the requirements of the surface landowner or as required by WDEQ/LQD.

Overall, despite the death, injury, and displacement of some animals, the cumulative impacts associated with the Proposed Actions or Alternatives are not expected to significantly reduce the size or viability of populations of any of the USFS Region 2 Sensitive Species. Many of these species have not been documented within the general Wright analysis area or associated USFS lands over the last 25 years, have already been displaced from those areas, or have remained present despite the ongoing mine and non-mine activities in and near those areas.

## H-5.0 TBNG PLAN COMPLIANCE

The Proposed Actions and Alternatives are considered to be in compliance with Grassland-wide, Geographic Area, and Management Area Standards and Guidelines for wildlife (including regionally sensitive species, and Management Indicator Species) detailed in the Grassland Plan (USFS 2002).

## H-6.0 REQUIRED MITIGATION AND RECOMMENDED MONITORING

To help protect USFS Region 2 Sensitive Species, the mine operator will notify the USFS District Ranger, Douglas, Wyoming, if sensitive species nests or dens, in addition to those identified in the Biological Assessment (Appendix G of this EIS), are located during mining. Future surveys for any USFS Region 2 Sensitive Species could be conducted in response to requests from the USFS Douglas District Ranger. This would allow assessments of how, and if, implementation of the TBNG Plan is benefiting these species.

Mitigation measures designed to reduce impacts to wildlife that are required by the Surface Mining Control and Reclamation Act (SMCRA) and state law include:

- Using raptor-safe power lines;
- Designing fences to permit wildlife passage;
- Creating artificial raptor nest sites;
- Relocating raptor nests and taking other action to maintain active nesting pairs;
- Restoring pre-mining topography to the maximum extent possible;
- Planting a diverse mixture of grasses, forbs, and shrubs in configurations beneficial to wildlife; and
- Building and maintaining sediment control ponds or other sediment control devices during mining.

To further minimize negative impacts to faunal species of concern, the USFWS requires additional species-specific protective measures, as well as targeted monitoring and mitigation plans for certain Region 2 Sensitive Species.

## H-7.0 USFS MANAGEMENT INDICATOR SPECIES EVALUATION

### H-7.1 Introduction

Species that have been identified by the Regional Forester as Management Indicator Species (MIS) must be considered for the Wright Area Coal Lease Applications because the general analysis areas for North Hilight Field, South Hilight Field, West Hilight Field, North Porcupine, and South Porcupine LBA Tracts include federal lands administered by the USFS. There is no USFS administered surface within the general analysis area for the West Jacobs Ranch LBA Tract. The purpose of this section of this Appendix is to provide information about the potential environmental effects that leasing the USFS administered lands would have on USFS TBNG Forest Plan MIS.

### H-7.2 Species Evaluated and Rationale

A Management Indicator Species is defined as a "plant or animal species or habitat components selected in a planning process used to monitor the effects of planned management activities on populations of wildlife and fish, including those that are socially or economically important" (USFS 2002). MIS are selected to serve as barometers for species diversity and viability. These species are monitored over time to assess the effects of management activities on their populations and habitat, and the populations of other species with similar habitat needs. MIS for the TBNG are identified by Geographic Area. In accordance with the TBNG Plan (USFS 2002), the greater sage-grouse was selected as the MIS to be evaluated for this project (as defined for the Hilight Bill Geographic Area).

For detailed sage-grouse habitat and population information, please see Section 3.10.5 in this EIS. This MIS evaluation and the Biological Assessment (Appendix G) of this EIS analyzes and discloses potential effects to wildlife if lands within the general Wright analysis area are leased and mined. The USFS Douglas Ranger District biologists have reviewed Section 3.10 and the BA in this EIS.

In addition to the information provided in this analysis, a full Biological Assessment and Biological Evaluation (BABE) document is being prepared for review by USFS Douglas Ranger District biologists as part of future permitting actions. Among other things, that document will provide supplemental information regarding local and regional population trends for the MIS (greater sage-grouse). The approved BABE will be available for public view at the Douglas Ranger District office.

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# APPENDIX I

## DRAFT EIS COMMENT LETTERS, BLM RESPONSES, AND HEARING SUMMARY

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ENCOURAGING RESPONSIBLE DEVELOPMENT TODAY ~ FOR TOMORROW

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POWDER RIVER BASIN
Resource Council

August 24, 2009

Sarah Bucklin
Bureau of Land Management
Wyoming High Plains District Office
2987 Prospector Dr.
Casper, WY 82604

Sent via electronic mail to casper_wymail@blm.gov

Re: Draft Environmental Impact Statement for the Wright Area Coal Lease Applications

Dear Ms. Bucklin,

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) and present our comments and concerns on the proposed Wright Area Coal Lease Applications.

The Powder River Basin Resource Council (PRBRC) has a long history of involvement working for responsible coal leasing and mining in the Powder River Basin. PRBRC was formed in 1973 by ranchers and concerned citizens of Wyoming to address the impacts of strip mining on rural people and communities. Today, we work for the preservation and enrichment of our agricultural heritage and rural lifestyle; the conservation of our unique land, mineral, water, and clean air resources, consistent with the responsible use of those resources to sustain the livelihood of present and future generations; and the education and empowerment of our citizens to raise a coherent voice in the decisions that will impact their environment and lifestyle. Our members live, raise families, ranch, work, and travel throughout the Powder River Basin near the various coal mines of the area. We write these comments on their behalf.

## I. BLM Must Properly Assess the Purpose and Need of this major federal action 1

At the outset of any NEPA document, a federal agency is required to analyze the purpose and need for the project. *See, e.g.* 40 C.F.R. § 1502.10 (describing the recommended format for an environmental impact statement). If the project is not needed, it is incumbent upon the agency to proceed with the no action alternative to avoid unnecessary environmental impacts

According to the Energy Information Agency's (EIA's) April 2009 Total Electric Power Industry Summary Statistics, coal generation is down 13.9% from April 2008 to 43.9% of total U.S. generation. In fact, according to the EIA "U.S. coal consumption declined in every coal-

consuming sector" and "[t]otal coal stocks at the end of 2008 were [up] 199.2 million short tons, an increase of 6.4 million short tons from the prior year."

On the other hand, wind energy is up 34.8% to 2.3% of total U.S. generation. While still a small portion of U.S. power, the trends are clear – renewable energy is growing while U.S. demand for coal and coal-fired power has flattened and is now decreasing.

That said, the BLM should not be leasing more coal at a time when demand for coal is down and there is a surplus in supply. Among other things, leasing coal at a time when demand is low and surpluses are high will impact the fair market value of coal and prevent the public from obtaining an optimum return on this federal resource. If the price of coal increases, "the bonus and royalty payments to the government [would] be higher." *See* DEIS at 2-67.

Further, BLM provides no indication of the overarching purpose and need for leasing coal on public lands at a time when demand is decreasing exponentially.

BLM's failure to determine and evaluate the true purpose and need for this federal action has a very important consequence in the context of NEPA: it prevents the agency – or the interested public through the public comment period – from evaluating a range of alternatives that will meet the project need and purpose. 2

For instance, delaying the sale of the lease tracts, an alternative which was not analyzed in detail, could potentially meet the project need and provide environmental and socio-economic benefits (such as potential increase in royalty revenue, increased opportunity and likelihood for contemporaneous reclamation, and improved local and regional air quality). Likewise, the no action alternative may be the most prudent choice at this time given the significant environmental and public health consequences of the other alternatives. However, given the lack of specific and detailed analysis in the DEIS about project purpose and need, it is almost impossible for a member of the public, or the agency, to exercise their judgment to determine what alternative is best.

As noted by BLM, "a decision to reject one or more of these six coal lease applications at this time would not preclude an application to lease that respective tract in the future." DEIS at 3-248. Thus, any delay in leasing by BLM in order to properly evaluate and expound on the legitimate purpose and need for additional coal leasing would not prejudice or harm the applicants. Therefore, BLM needs to properly assess supply and demand of coal and determine whether delaying the sale should be the preferred alternative for this project. Additionally, the decrease in demand for coal supplies gives the BLM an opportunity to properly evaluate the impacts of additional leasing (including but not limited to ensuring compliance with reclamation and other standards).

## II. BLM should not lease the tracts unless air quality impacts will be minimized and air quality standards will be complied with 3

According to the DEIS, "From 2001 through 2006, there were 29 monitored exceedances of the 24-hour $PM_{10}$ standard at seven operating mines in the Wyoming PRB…In 2007, there were a

total of six exceedances at three operating PRB surface coal mines, five of which occurred in the general Wright analysis area." The Black Thunder Mine alone caused seven exceedances of the 24-hour $PM_{10}$ standard in 2007. DEIS at S1-6.

The Wyoming Department of Environmental Quality's (WDEQ) "Natural Events Action Plan" does not provide a legal basis for the BLM to ignore violations of air quality standards. As the BLM is aware, this is a "policy" not a regulation—in fact it has never been promulgated in the DEQ regulations. In this case, it would be unlawful and an abuse of agency discretion for BLM to lease additional acres in the Wright analysis area where, as here, there are currently exceedences of air quality standards that are unmitigated.

Federal permitting or leasing actions in the Powder River Basin (and especially on public lands) should be designed to prevent exceedances in the first place. If BLM is leasing coal, without mitigation measures, and knowing that air quality standards will likely be exceeded, the agency is not meeting its duties to prevent violations of air quality standards. FLPMA mandates that BLM manage federal lands according to federal and state air quality standards.[1] The Mineral Leasing Act also mandates that the agency insert in each coal lease provisions that require compliance with the Clean Air Act (as well as the Clean Water Act). 30 U.S.C. § 201. Thus, the BLM must ensure compliance with all air quality standards on existing leases in the Wright lease area and prior to conducting any additional leasing.

Additionally, and at a minimum, BLM in coordination with the WDEQ, who is a cooperating agency in this EIS, must ensure compliance with the prevention of significant deterioration (PSD) requirements of the CAA for NOx, PM and SO2. In particular, BLM must determine how much (if any) of the existing increment is available for additional and expanded coal mining and development. Similarly, the BLM in coordination with EPA must determine, prior to leasing, how the agencies will address regulation of $CO_2$ from mining operations as well as implementation of new standards for ozone. Even if some of this analysis will be conducted during DEQ's air quality permit process, BLM must include this information as part of this NEPA process. NEPA requires complete analysis of environmental impacts prior to an agency taking action.

BLM must also discuss and require enforceable mitigation measures through this EIS and Record of Decision to ensure that compliance with air quality standards is ensured both now and in the future, especially considering the result of cumulative increases of particulates and NOx from these mines.

Moreover, BLM needs to ensure compliance with the Regional Haze Rule. A full review of data gathered for national parks and wilderness areas within 300 km of the proposed mining activities is necessary for compliance with the Regional Haze Rule. Significant data is available to assess impacts on Wyoming's Class I areas as well as those in Montana and South Dakota that may

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[1] *See* 43 C.F.R. § 2920.7(b)(3) (requiring that BLM "land use authorizations shall contain terms and conditions which shall . . . [r]equire compliance with *air . . . quality standards* established pursuant to applicable Federal or State law") (emphasis added); *see also* 43 U.S.C. § 1712(c)(8) (requiring BLM in land use plans—which would therefore require implementation in daily management—to "provide for compliance with applicable pollution control laws, including State and Federal air . . . pollution standards or implementation plans").

experience visibility impacts from the proposed mining. The DEIS does not include an analysis of what those impacts may be or how they may be mitigated.[2]

In a related issue, the DEIS states that Air Quality Related Values (AQRVs) as established by land managers are "not legally enforceable as a standard," but the DEIS fails to state what significance should be attached to AQRVs. DEIS at section 3.4.4. Although AQRVs lack the legal force of criteria pollutant emission limits, for example, they are not without legal significance. The DEIS provides no discussion of how AQRVs should factor in the air quality permitting process, a serious omission in guiding regulators to weigh EIS input appropriately. The Final EIS must address protection of AQRVs.

Finally, BLM must properly assess whether new source review permitting is required for the expanded coal mining operations. Currently, Wyoming DEQ exempts surface coal mines from Clean Air Act major source review. DEIS at 3-81. However, Wyoming regulations include a definition of a major stationary source as "any physical change that would occur at a stationary source not otherwise qualifying under this definition if the change would constitute a major stationary source by itself." WAQSR Ch. 6 § 4(a).

A "stationary source," according to the Wyoming State Implementation Plan (SIP), includes "any structure, building, facility, equipment, installation or operation (or combination thereof) which emits or may emit any air pollutant subject to these regulations or regulations under the Federal Clean Air Act." *Id.* It is therefore a misstatement of the law to say that major expansions of existing stationary sources can be exempted from New Source Review at the discretion of WDEQ. If the physical change – in this case a major expansion of mining operations – constitutes a major stationary source by itself, then all legal requirements applicable to a major stationary source, including New Source Review and Prevention of Significant Deterioration permitting, must apply.

The DEIS does not address the key question of whether or not the physical change contemplated would constitute a major stationary source by itself. If a major stationary source is created – under the definitions established by federal law – then New Source Review cannot be avoided. The DEIS must address this definitional question and the potential legal requirements therein entailed. Permitting a minor source that in combination with future contemplated activities will constitute a major source is "sham permitting" and a violation of federal law.

## III. BLM must consider the environmental impacts of climate change caused by increased coal mining and should consider measures to mitigate those impacts 4

During coal mining operations, methane that was previously trapped within the coalbed may be released (i.e. gob gas). Methane is a powerful greenhouse gas – an estimated 20 times as potent

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[2] According to DEQ and EPA regional haze regulations, "A single source that is responsible for a 1.0 deciview change or more should be considered to ''cause'' visibility impairment." Wyo. Air Quality Standards and Regulations (WAQSR) Chapter 6, § 9(d)(i)(A); 40 C.F.R. Part 51, Subpart P, Appendix Y—Guidelines for BART Determinations Under the Regional Haze Rule, Section III A. 1. There is no analysis in the DEIS of whether the coal mines meet this standard.

as carbon dioxide. The estimated annual carbon dioxide equivalent from methane venting related to these coal tracts is 483,600 metric tons. DEIS at 3-307.

The waste of methane is also the waste of a valuable commodity, and BLM has specifically directed agency staff to "prevent avoidable waste of the public's resources" and "mitigate environmental impacts" resulting from resulting from coalbed methane and coal mining conflicts. BLM Instruction Memorandum No. 2006-153. Further, PRBRC notes that a recent IBLA decision provides the BLM with authority to authorize the coal lessee to capture methane as part of coal mining. *Vessels Coal Gas, Inc.*, 175 IBLA 8 (2008).

Despite the damaging global warming impacts from the methane to be released, and the wanton waste of a much sought-after non-renewable natural resource, the BLM and Interior Department are approving additional mine leasing and expansion without analyzing the potential for capturing and using the methane. Nor did these agencies analyze the alternative of flaring – i.e., burning – the methane to drastically reduce the project's global warming impacts. The agencies failed to examine these alternatives despite the fact that methane is routinely captured at working coal mines in the United States and around the world, and despite the fact that methane is flared at working mines in Europe and Australia. The federal agencies' failure to even consider these reasonable mitigation measures and failure to account for the impacts of methane venting on climate change violates NEPA.

Additionally, methane capture or methane recovery prior to mining operations would allow recovery of federal natural gas in an area that is already slated for development. This is preferable to greenfield natural gas development in sensitive areas, such as Fortification Creek, where BLM is currently permitting coalbed methane operations in spite of public concerns and opposition. As BLM notes, the majority of the oil and gas within the analysis area (67 percent) is federally owned and "most…is currently leased." DEIS at 3-228. BLM needs to assess of the 212 currently producing CBM wells in the study area, DEIS at 3-228, how many will be plugged and abandoned by the time the tracts are mined? Will wells be abandoned prior to complete recovery of the resource and if so, approximately how much methane will be left that will be vented in the course of mining? BLM notes that "a large portion of the CBNG resources on the tracts has been recovered or would be recovered prior to mining" but also that "CBNG that is not recovered prior to mining would be vented to the atmosphere during the mining process." DEIS at 3-303. BLM needs to take the analysis one step further and determine whether delaying the lease of the coal tracts until methane recovery is complete is in the best interest of the public. If not, BLM must ensure proper mitigation such as methane capture.

As noted above, methane capture is a reasonable measure that can be implemented at these mines. For instance, the North Antelope Rochelle Mine has a methane capture project that involves methane drainage from surface wells in advance of the mining face. According to EPA, "the project is estimated to reduce 200,000 tonnes of carbon dioxide equivalent annually." In addition to the climate change benefits, the mining company also receives economic benefits through the carbon credit process. U.S. EPA, Coalbed Methane Outreach Program, May 2009 newsletter, at 7, *available at* http://www.epa.gov/cmop/docs/spring_2009.pdf.

Additionally, BLM should consider alternatives for the mining process that will mitigate the climate change impacts of these mines. As electrical power consumption during the mining process is one of the largest sources of carbon emissions from mining, BLM should mandate requiring renewable energy to power mining. According to recent press reports, some mines in the Powder River Basin have already been considering wind power or other renewable energy power sources for mining operations. This would be preferable to the consumption of coal-fired electricity, which increases the need for new power plants such as Basin Electric Power Cooperative's Dry Fork Station (which, according to Basin Electric, is being built to provide power to industrial operations in Northeast Wyoming). 5

In addition to the climate impacts of the mining process, BLM must also assess and mitigate impacts of the coal cycle, which are related and connected actions to the mining process. Mined coal will be sent via train to coal-fired power plants. Coal-fired power plants are the leading emitter of carbon dioxide. These emissions cause global warming, or climate change, which is widely acknowledged to pose "serious and well recognized" impacts to the human environment and is a pollutant under the Clean Air Act. *Massachusetts v. EPA*, 127 S. Ct. 1438, 1455 (2007).

BLM must analyze, and consider reasonable mitigation alternatives for, these reasonably foreseeable impacts in this EIS. Secretarial Order No. 3226 (1/16/09) recognizes the ability of the Department of Interior (DOI) to identify changes that may result from climate change and directs bureaus to "consider and analyze potential climate change impacts" in "long range planning" and/or when making "major decisions affecting DOI resources." Clearly, this leasing action is "long range planning" as the coal will not be needed for many years and is a "major decision affecting DOI resources" given the amount of coal being leased.

We believe BLM must consider and appropriately address the comments of other parties, such as the Center for Biological Diversity, discussing climate change on a national and global scale. Additionally, the EIS must discuss not only projected global impacts but the anticipated dramatic local impacts in Wyoming and other Western states. Numerous studies have documented that climate change will dramatically impact states like Wyoming. For instance, the National Wildlife Federation estimates that "Global warming is likely to alter essential habitat in the Greater Yellowstone Ecosystem" and impact plant and animal species across the state. Global warming could also impact industries that depend on snow and water resources, such as skiing, tourism, and agriculture. In a report released in May 2008, the U.S. Department of Agriculture found "climate change is already affecting U.S. water resources, agriculture, land resources, and biodiversity, and will continue to do so." For these reasons and others, State Climatologist, Steve Gray, has warned that global warming could dramatically impact Wyoming, especially water supplies in the state. Communities in Wyoming, including the City of Gillette, are already facing water shortages and climate change impacts caused by increased coal mining could intensify those impacts. The DEIS needs to assess both local and global climate change impacts caused by mining these coal tracts. 6

## IV. BLM must properly assess land use impacts

BLM's preferred alternative includes 12,480 federal acres (about 1/3 of the acres proposed to be leased). DEIS at 3-221. While BLM acknowledges that "livestock grazing on native rangelands

is the primary land use," *Id.*, BLM does not properly assess the socio-economic impacts of turning these portions of the Thunder Basin National Grassland from livestock and wildlife habitat into coal mines. How many grazing leases will be lost? What is the value of those leases? How is BLM, in conjunction with the Forest Service (who is a cooperating agency to this EIS), ensuring that multiple use standards will be protected? This is especially relevant given the lack of contemporaneous reclamation at current mining operations (see discussion below). BLM is leasing yet more tracts of coal which is putting a further strain on grazing and other land uses in the area. 54

BLM must assess how long land uses will be impacted (e.g. what is the expected time frame for reclamation and the area to re-gain access for grazing, hunting, and recreational purposes?). The EIS says that the "loss of accessibility to lands successfully leased and proposed for mining is long term" but "[p]ublic access to federal lands would be restored after mining and reclamation are complete." DEIS at 3-246,3-247. How many years? This analysis is critical to ensuring proper consideration of socio-economic impacts prior to agency action. 7

The EIS also notes that the area is currently used for oil and gas operations. Will "ancillary facilities…needed to support oil and gas production" such as pipelines, powerlines, access roads, etc. currently on the tracts be moved to new areas? Will they still be needed for oil & gas activities once mining takes place on the tracts? How will this impact neighboring lands? BLM must analyze the movement of these facilities to new lands as they are connected actions to the leasing of the coal reserves. 8

## V. BLM must not lease new tracts of coal without first ensuring compliance with SMCRA's contemporaneous reclamation mandates for existing tracts

Once again, BLM fails in this EIS to disclose reclamation data for current mining operations and projected timelines for reclamation of new tracts.[3] This information is critical to assessing the environmental impacts of new mining operations. SMCRA requires that reclamation of mined land be "as contemporaneous as possible." 30 U.S.C. § 1202(e). 9

If BLM does not have this information, surely BLM's cooperators on this DEIS do. OSM and DEQ are both cooperators and have access to reclamation data given they are the agencies charged with SMCRA compliance.[4] BLM cannot keep pointing fingers elsewhere and ignore its responsibility to ensure compliance with federal laws and regulations. BLM's role in the process

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[3] By reclamation, we mean stage 3 bond release, which is indicative of final reclamation for mining tracts. Although there is some information about lands that have been "reclaimed or [are] in the process of being reclaimed," DEIS Section 3.0, the EIS does not disclose the amount of lands that have been released from bonds as a result of reclamation. The EIS also does not discuss reclamation plans for new mining tracts.

[4] In previous coal mine EIS comments, we have submitted data from OSM on reclamation. *See, e.g.* Office of Surface Mining Reclamation and Enforcement, Annual Evaluation Summary Report, Administered by the Land Quality Division of the Wyoming Department of Environmental Quality for Evaluation Year -- 2005 (July 1, 2004 to June 30, 2005) August 24, 2005, *available at* http://www.osm.gov/oversight/wyoming04.pdf. OSM states that "the rate at which lands are being reclaimed in Wyoming compared to the rate of disturbance…is about 3 to 1... Ideally the ratio should be 1 to 1... The gap between the acres disturbed versus reclaimed is widening, thereby creating a backlog of lands available for reclamation, contributing to a delay in contemporaneous reclamation and subsequent bond release."

– leasing the coal on federal lands – is not trivial. In fact, it is the go or no go stage for mining operations. Once leased, other agencies, such as DEQ, claim to have little ability to prevent new mining because of pre-existing lease rights. BLM has the sole ability to control the pace and scale of coal leasing and subsequent mining in response to the failure of mining companies to comply with SMCRA mandates. In short, if SMRCRA mandates are not being complied with, BLM must not lease new coal and instead should wait to lease new tracts until reclamation of current tracts is complete.

In addition to SMCRA, BLM has a legal obligation under its organic statute, the Federal Land Policy and Management Act, to "prevent unnecessary or undue degradation of the lands." 43 U.S.C. §§1702(c), 1732 (b). This provision has been interpreted to require BLM "to prevent, not only unnecessary degradation, but also degradation that, while necessary to [mineral activity], is undue or excessive." *Mineral Policy Center v. Norton*, 229 F.Supp.2d 30, 42 (D.D.C. 2003). These requirements are applicable on both federal surface and split-estate lands. *See* 2003 PRB Oil and Gas RMP-EIS ROD at 10 ("To meet the consistency requirements of FLPMA, the same standards used for environmental protection of Federal surface are also applied to the federal mineral portion of split estate lands (private surface underlain by federal minerals)"). Permanent alteration of the land as a result of untimely or failed reclamation is unnecessary and undue degradation, which BLM can prevent by delaying or preventing the lease of these federal coal tracts.

BLM has a duty under NEPA to fully disclose and evaluate SMCRA compliance and environmental impacts of coal leasing and associated mining. The lack of contemporaneous reclamation is a significant impact that must be properly analyzed. Lack of reclamation has substantial impacts, such as the spread of noxious weeds, decreased air quality as a result of a larger area of disturbance, less water restoration, and a longer loss of livestock and wildlife pastureland.

## VI. BLM should not lease new coal tracts without first ensuring compliance with SMCRA's hydrologic balance protection requirements

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The coalbed in the Powder River Basin is itself an aquifer. According to the EIS, "Due to its continuity, the Wyodak coal seam is considered a regional aquifer" and "[h]istorically, the Fort Union coal seams have been a source of groundwater for domestic and livestock uses in the eastern PRB." DEIS at 3-94.

With great consequence to those who live and ranch in the Powder River Basin, "[r]oughly 30 years of surface mining and the more recent CBNG development have resulted in complete dewatering of the coal aquifer in localized areas." DEIS at 3-95. There is a "continuous cone of depression" around the mines because of cumulative groundwater drawdown. *Id.*

These statements essentially acknowledge that coal mining is resulting in material damage to the hydrologic balance of ground and surface water and that compliance with SMCRA's statutory requirement to restore the regional Wyodak coal aquifer to "pre-mining conditions" may in fact be impossible.

That said, it is incumbent upon the agency to demonstrate: (1) how disturbance to ground/surface water from coal mining is currently being mitigated and restored to pre-mining conditions; and, (2) analyze how additional leasing (and subsequent coal development) would serve to minimize disturbance to ground and surface water, restore the recharge capacity of both the mined and leased area and restore the aquifer to pre-mining conditions. At a minimum, the agency must analyze aquifer recharge capacity, what engineering techniques would be used to restore the aquifer to pre-mining capacity and water quality conditions, and what timetable and costs would be involved with such reclamation. The same must be done for surface water. This analysis is important to "insure the professional integrity, including scientific integrity, of the discussions and analyses" in this NEPA document. 40 C.F.R. § 1502.24. Mere speculation that aquifers will be recharged some time in the very distant future is not enough.

Additionally, the ongoing damage to ground and surface water by current coal mining operations warrants additional bonding in an amount that covers mine-wide restoration of the hydrologic balance of the surface and ground water to pre-mining conditions --and for each of the mines which would gain additional leased acreage. Under the Federal Coal Leasing Act Amendments, the need for additional bonding for each of the four mines must be evaluated by the agency during the NEPA process prior to leasing and any analysis should be re-noticed to the public. 30 U.S.C. § 201 et al.

## VII. BLM needs to ensure compliance with the Mineral Leasing Act and the Federal Coal Leasing Act Amendments

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The agency has failed to demonstrate compliance with the Mineral Leasing Act (MLA) and Federal Coal Leasing Act (FCLAA). Among other things, the MLA requires that the agency ensure that no person or corporation (including subsidiaries thereof) hold or control at one time "coal leases or permits on an aggregated of more than 75,000 acres in any one State and in no case greater than an aggregated of 150,000 acres in the United States." 30 U.S.C. § 184.

In this case, the BLM has a statutory obligation to ensure that the nominating companies (who have filed applications in an effort to expand their existing operations) are in compliance with this provision prior to any lease sale of the federal coal tracts. Compliance with these statutory provisions must be evaluated based on an evaluation of the holdings of parent companies. These companies include Arch Coal, Peabody Energy Corporation, and Rio Tinto Energy America.[5]

Upon information and belief and upon review of publicly available information, PRBRC believes that these three companies hold or control aggregated coal leases in excess of the acreages allowed for the in MLA. Compliance with this statutory provision must be analyzed by the agency and needs to be included as part of the NEPA process.

## VIII. BLM must properly assess sage-grouse impacts and develop mitigation measures

The BLM should expand its wildlife survey area. The wildlife surveys conducted for this EIS included the land projected to be leased and "a 2-mile perimeter surrounding the general analysis

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[5] However, it should be noted that the Federal Trade Commission recently gave its approval for the sale of Jacobs Ranch Coal Mine from Rio Tinto Energy America to Arch Coal, so the Jacobs Ranch leases should be assessed under Arch Coal.

area." We believe the surveys should be extended to a four-mile radius, which is the now recognized radius for impacts related to sage-grouse from oil and gas operations. *See, e.g.* Carr Draw 3-E Plan of Development Environmental Assessment and Augusta Unit Zeta Project Environmental Assessment, available on the Buffalo BLM's NEPA webpage. Given the noise[6] and other impacts related to coal mining, in the absence of studies specific to coal mining, BLM should at least be consistent with its own oil and gas leasing and permitting practices.

BLM also needs to ensure compliance with its Sensitive Species Policy. BLM has a duty to mitigate impacts to the greater sage-grouse, a state listed sensitive species. Species are designated as "sensitive" to ensure actions on BLM administered lands consider the welfare of these species and do not contribute to the need to list a Special Status Species under the provisions of the Endangered Species Act. BLM Wyoming Sensitive Species Policy and List at 1. Beyond requiring the BLM not to take actions that lead to ESA listing, the BLM Special Status Species Management Manual Provisions also provide that the requirement to conserve special status species means "to use, and the use of, methods and procedures such that there is no longer any threat to their continued existence *or need for listing as a special status species*." *See* BLM Manual 6840 at Glossary of Terms (defining conservation, conserve, and conserving). Thus, with regard to sage-grouse, the BLM is required to take affirmative steps that lead to *removing* the species from the sensitive species list and not simply avoiding activities that may lead to *future* listing under the ESA. To comply with these policies, BLM management decisions must "avoid or minimize adverse impacts and maximize potential benefits to [sensitive] species." BLM Wyoming Sensitive Species Policy at 2.

According to the EIS, there are four sage-grouse leks that are active and occupied within the study area. DEIS at 3-201. Also according to the EIS, almost ½ of the study area is sagebrush and "[u]ntil sagebrush returns to its premining density levels, there would be a reduction in potential habitat for wildlife species." DEIS at 3-207. However, there is no analysis in the EIS of whether sage-grouse populations will be impacted by mining operations. Will leks be abandoned? Will local populations be extirpated? Have habitat surveys been completed to determine whether high quality nesting, brooding, or wintering habitat is present in the area? If so, what percentage of that habitat will be impacted by mining operations? As BLM notes, "there is no evidence that populations attain their previous levels [after reclamation], and reestablishment in reclaimed areas may take 20 to 30 years or longer." DEIS at 3-208. Again, BLM cannot just use speculation to determine impacts and must do a site-specific analysis of impacts to sage-grouse populations and habitat. This analysis is critical in order to determine, among other things, whether additional lease conditions or stipulations are necessary to protect species including the grouse.

Given the importance of sage-grouse in state and federal policy right now, BLM should do a much better job in assessing impacts *and* more importantly, in developing measures to mitigate those impacts. An ESA listing will have substantial economic impacts on all industries in Wyoming, including agriculture, and thus our members want to ensure that BLM does all it can to comply with its Sensitive Species Policy.

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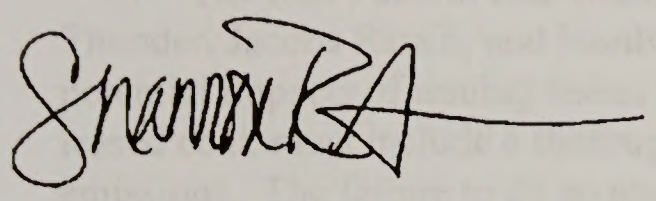
[6] The EIS acknowledges that "noise associated with mining operations may disrupt sage-grouse breeding and nesting activities..." DEIS at 3-208.

Thank you for your time and consideration of these comments. If you have any questions or need more information, please do not hesitate to contact me at 307-672-5809 or via email at sanderson@powderriverbasin.org.

Sincerely,



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Bureau of Land Management
Wyoming High Plains District Office
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August 25, 2009

**Re: Comments on the Wright Area Coal (WAC) Lease Applications and Comments on Draft Environmental Impact Statement for the Proposed WAC Applications, 74 Fed. Reg. 32642 (July 8, 2009)**

Dear Ms. Bucklin:

Thank you for the opportunity to comment on the Wright Area Coal ("WAC") Lease Applications and Draft Environmental Impact Statement ("DEIS"). These comments are submitted on behalf of Defenders of Wildlife ("Defenders"), a non-profit public interest conservation organization with over 500,000 members nationally.

Defenders is dedicated to protecting imperiled species and their habitats by combining scientific research, public organizing, and administrative and legal advocacy. Defenders relies on the Endangered Species Act ("ESA"), and other federal conservation laws to protect endangered and threatened species, and imperiled species not currently benefiting from ESA protections. In addition to species-specific litigation, Defenders is a committed advocate for the protection of the nation's wildlife refuges, parks, forests and other public lands.

Our nations lands and natural resources will undoubtedly be effected by climate change, DEIS, 4-110, and the Bureau of Land Management ("BLM") is obligated to consider the impacts in a revised DEIS. In February 2007, the Intergovernmental Panel on Climate Change ("IPCC") declared, "[w]arming of the climate system is unequivocal," and it is "very likely" that most of the warming since the middle of the 20th century is the result of human pollutants. Global warming is a global crisis with well-documented and considerable local impacts. In addition to its other disruptive direct effects, the mining of coal will likely result in the generation of high quantities of greenhouse gas emissions, a significant contributor to global warming.

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The four Federal coal Lease-by-Applications ("LBAs") are adjacent to the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines. The DEIS analysis of the potential impacts of issuing leases for six Federal coal tracts, totaling over 2.6 billion tons of leased coal, must include a thorough analysis of the impacts from increased greenhouse gas emissions. The failure to do so results in a deficient environmental analysis in violation of the National Environmental Policy Act ("NEPA").

**The DEIS Fails to Analyze Greenhouse Gas Emissions**

6

In 2006, the Wyoming Powder River Basin ("PRB") coal mines produced approximately 432.0 million tons of coal. and approximately 716.9 million metric tons of carbon dioxide. DEIS, 4-118. This estimate represents approximately 33.6 percent of the estimated 2,134.1 million metric tons of U.S. carbon dioxide emission from coal combustion. Id. In 2006, Wyoming PRB mines accounted for approximately 37.2 percent of the coal produced in the U.S. Id.

Out of the 432.0 million tons of coal produced in 2006 from the PRB, the three Wright Area coal mines produced 195.9 million tons of that coal in 2006, which represents about 45.4 percent of coal produced in the Wyoming PRB in 2006, or about 6.4 percent of the estimated U.S. carbon emissions in 2006. DEIS, 4-121. Under the No Action Alternative, $CO_2$ emissions attributable to burning coal produced by the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines would be extended at about this level for up to approximately 11 years beyond 2008, in which time the mines recover their remaining estimated 2,691 million tons of currently leased coal reserves. Id.

NEPA requires that the BLM prepare an Environmental Impact Statement ("EIS") for "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(c). The EIS is "a procedural obligation designed to assure that agencies give proper consideration to the environmental consequences of their actions." Arizona Cattle Growers' Ass'n at 1110 (citing Merrell v. Thomas, 807 F.2d 776, 777-78 (9th Cir. 1986)). In addition, the EIS serves to inform both decision makers and the public about the alternatives and adverse impacts of the project. See Columbia Basin Protection Ass'n v. Schlesinger, 643 F.2d 585, 592 (9th Cir. 1981) ("[T]he preparation of an EIS ensures that other officials, Congress, and the public can evaluate the environmental consequences independently.").

The BLM failed to adequately address the greenhouse gas emissions that will be emitted as a result of leasing the LBA tracts, instead limiting the emissions inventories to "mining operations, electricity used on site . . . and mining processes . . . ." DEIS, 3-306. The DEIS emits from the emissions inventory all carbon dioxide emissions from "rail transport" because of a lack of information Id. With carbon dioxide emissions projected to increase at

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the Black Thunder, Jacobs Ranch and North Antelope Rochelle mines if the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts are added to the mining operations, combined annual production rate from these three mines is 270 tons. DEIS, 3-307.

The BLM disregarded NEPA's mandate to disclose the full environmental consequences of the Wright Area coal project, and instead hid the true cost of the project. The BLM stated that it is "not possible to project the level of $CO_2$ emissions that burning the coal from the six Wright Area Coal LBA tracts would produce due to the uncertainties about what emission limits will be in place at that time or where and how the coal in these LBA tracts would be used after it is mined." DEIS, 4-122. The BLM cannot escape NEPAs environmental analysis mandate with the conclusory statement that "because there are multiple other sources of coal that . . . could supply the demand for coal beyond the time that the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines compete recovery of the coal in their existing leases" that there would be no decrease in U.S. carbon emissions attributable to coal-burning power plants. DEIS, 4-122. 5

By failing to consider the total greenhouse gas emissions that will result from the coal lease, and instead limiting the analysis to selected emissions, the DEIS fails to properly consider the greenhouse gas and global warming implications of the lease sale, prior to proceeding to the Final EIS. The inadequate NEPA analysis, including the failure to estimate and calculate the carbon emissions that will result from the leases, results in an inadequate DEIS.

**The DEIS Fails to Analyze the Observed and Projected Effects of Global Warming** 6

Global warming represents the most significant and pervasive threat to the future of biodiversity worldwide, affecting both terrestrial and marine species. The periodic assessment reports issued by the United Nations Intergovernmental Panel on Climate Change ("IPCC") serve as a useful barometer for the advancement of understanding surrounding global warming. The IPCC's mission is to comprehensively and objectively assess the scientific, technical and socioeconomic information relevant to human-induced climate change, its potential impacts, and options for adaptation and mitigation (IPCC Mandate). T he technical reports underlying these periodic assessments are a synthesis of the existing scientific and technical literature compiled by the world's leading climate change experts, representing the collective wisdom of thousands of scientists from around the world, including hundreds of academic and government researchers within the U.S. The reports represent the "best available science" addressing climate change and its impacts on the natural world.

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The IPCC reports convincingly indicate that greenhouse gases, including carbon dioxide ("$CO_2$"), endanger public health, welfare, and the environment. The IPCC's fourth assessment report, issued in February 2007, determined that the evidence of warming global temperatures is "unequivocal" and that observed changes in temperatures since the mid-20th century have been "very likely" (>90% chance) caused by increases in anthropogenic greenhouse gas emissions. In addition, the largest growth in global greenhouse gas emissions between 1970 and 2004 has come from the energy supply sector (an increase of 145%) (IPCC).

Many of the public resources managed by the Department of the Interior are being harmed by global warming resulting from increased greenhouse gas emissions (see generally GAO, Climate Change). As stated by the U.S. Supreme Court last year, "[t]he harms associated with climate change are serious and well recognized." Massachusetts v. EPA, 127 S. Ct. 1438, 1455 (2007). These harms—already occurring worldwide—include "the global retreat of mountain glaciers, reduction in snow-cover extent, the earlier spring melting of rivers and lakes, [and] the accelerated rate of sea levels during the 20th century relative to the past few thousand years." Id. (quoting National Research Council, Climate Change: An Analysis of Some Key Questions, at 16). The impacts from global warming on species and ecosystems are not too uncertain to predict.

For example, one of the most immediate general effects of climate change on terrestrial plants and wildlife are shifts in geographical ranges, catalyzed by changes in the normal patterns of temperatures and humidity that generally determine such ranges (Thuiller 2007). As a result of warming temperatures, significant range shifts averaging 6.1 kilometers per decade towards the poles and an advancement of spring events by 2.3 days per decade have already occurred (Parmesan & Yohe 2003). Because many ecosystems and species cannot make such "shifts," global warming presents risks of widespread extinctions (Thomas et al. 2004; Thuiller 2007).

In addition to general impacts, different regions throughout the world will be increasingly affected in ways specific to those locations.

The Arctic region has been the most obvious early indicator of the effects of global warming on the planet. While the planet as a whole warmed approximately 1°F during the 20th century, some regions of the Arctic experienced warming of 4-5°F since the 1950s alone, and the region continues to warm at rates approximately twice that in the rest of the world (ACIA 2004).[1] Most notably, the melting of Arctic sea ice due to global warming has

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[1] A phenomena known as the "Ice-Albedo feedback" is largely responsible for these disproportionate effects. Because the arctic ice has high albedo, meaning it reflects much more solar radiation than

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occurred much more rapidly and on a scale that scientists believed would not happen for another half century. At the end of summer in 2007, the volume of Arctic sea ice was half what it was only four years ago, nearly 23 percent below the previous record low. (Borenstein 2007).

The rapid melting of the Arctic ice has grave repercussions for the many Arctic species that rely wholly or partially on the ice for feeding, nesting, breeding, sheltering, and other essential behavioral functions. The melting of Arctic sea ice caused by global warming directly threatens the polar bear, which is completely dependent on the ice for every aspect of its life cycle. Melting sea ice will shorten the time frame in which polar bears can hunt seals due to earlier ice break-up and later freeze-up dates, reduce availability of prey, increase distances bears need to swim because of melting ice, and increase bear-human conflicts as bears move into terrestrial and populated areas in search of food.

Additionally, the world's oceans, occupying 70 percent of the planet, are being profoundly affected by global warming, as primarily evidenced by warming temperatures and increasing acidification of the oceans (Rosenzweig 2007). Coral reefs have served as an early bellwether of these changes, and NMFS on May 9, 2006 determined two species—the elkhorn (*Acropora palmata*) and staghorn (*A. cervicornis*) corals—to be threatened, the first coral species to be give protection under the ESA. 71 Fed. Reg. 26,852.

In addition to the precipitous declines in staghorn and elkhorn coral populations as a result of global-warming inducted bleaching, global warming also adversely affects coral species by increasing the acidification of ocean waters (Hoegh-Guldberg 2007). Ocean acidification is especially driven by $CO_2$; as greater levels of $CO_2$ enter the ocean, it reacts with seawater to produce carbonic acid, which ultimately reduces the amount of carbonate available to the reefs, leading to decreased calcification and increased erosion. In a recent study, a team of researchers presented three scenarios based on the business-as-usual/alternative scenario approach, and found that even if $CO_2$ emissions leveled at 380 ppm, coral reefs worldwide would still undergo fundamental changes (Hoegh-Guldberg 2007). If carbon dioxide levels rise to double that of preindustrial levels under a business-as-usual approach, "[t]hese changes will reduce coral reef ecosystems to crumbling frameworks with few calcareous corals…Under these conditions, reefs will become rapidly eroding rubble banks" (Hoegh-Guldberg 2007).

Like the rapidly accumulating evidence addressing the negative effects of global warming on coral reef species and the polar bear, new scientific information demonstrates

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other sources, once that ice melts, the uncovered land and water absorbs more solar radiation, leading to a positive feedback loop and rising temperatures.

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that global warming is increasingly having negative effects throughout the western United States. The west has warmed more than any other area in the country outside of Alaska, with projections of future warming varying from 3 to 7°F, to as much as 14°F in the Southwest (Leung and Qian 2005; Overpeck 2005). As new scientific information developed since 1996 convincingly demonstrates, global warming is already affecting the West by causing wetter and warmer winters with reduced snowpacks and earlier springs with associated early-season melting of the already-reduced snowpack (Mote et al. 2005). In addition, many areas of the West are in the midst of the worst drought in hundreds of years, and researchers believe global warming could cause drought to become essentially permanent.

This combination of effects is already having real-world consequences for biological resources. For example, scientists identified high temperatures as one of the likely causes of a massive die-off of piñon and ponderosa trees across 3.5 million acres of Arizona and New Mexico (Breshears et al. 2005). In addition, less snowpack and earlier snowmelt have been correlated with increasing numbers of large forest fires in the west, as earlier snowmelt acts to dry out forest fuels (Westerling 2006).

The effects of global warming present heightened risks to species already imperiled by other causes, especially those with restricted ranges or highly specific ecological needs (Randall 2006). Climate change during the past 30 years has in fact already been implicated in one species-level extinction, and a potential mass extinction (an estimated 67 percent of 110 species) of *Atelopus*, a genus of amphibians endemic to the American tropics (Pounds et al. 1999; Pounds et al. 2006). If levels of greenhouse gases continue to rise unabated, newly-developed science indicates that extinction levels in the U.S. and worldwide would likely be catastrophic. As stated by James Hansen, senior scientist at Columbia University Earth Institute and Director of the NASA Goddard Institute for Space Studies:

> In my opinion there is no significant doubt (probability >99%) that [] additional global warming of 2°C would push the Earth beyond the tipping point and cause dramatic climate impacts including eventual sea level rise of at least several meters, extermination of a substantial fraction of the animal and plant species on the planet, and major climate disruptions. Much remains to be learned before we can define these effects in detail, but these consequences are no longer speculative climate model results.

(Hansen 2006). Echoing this assessment, a team of 18 scientists recently estimated that 15-37 percent of terrestrial species within sample regions covering approximately 20 percent of the Earth's surface would be "committed to extinction" by 2050 if greenhouse gas emissions continue rising on current trajectories (Thomas et al. 2004). If those percentages of loss are extrapolated to a planetary level, more than 1 million species could be driven extinct in the

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next fifty years (Thomas et al. 2004). Many ocean species will also suffer pronounced losses (Hunter 2007).

The BLM is required under NEPA to analyze global warming impacts that result from its actions

The severity of the climate crisis was recognized by the U.S. Supreme Court in April 2007, when it ordered the Environmental Protection Agency to confront the problem. The Supreme Court held, in Massachusetts v. EPA, 127 S. Ct. 1438 (2007), that the "unambiguous" definition of "air pollutants" includes carbon dioxide and other greenhouse gases. The Supreme Court's ruling is widely viewed as a landmark recognition of the global warming crisis by the judiciary. The Court noted that the "[t]he harms associated with climate change are serious and well recognized." Id. at 1455. The Court also acknowledged "the enormity of the potential consequences associated with man-made climate change," and the contribution of carbon dioxide emissions to global warming. Id. at 1457-58. The "harms associated with climate change are serious and well recognized," and the federal government has a responsibility to take action to reduce it, even if such action may not completely reverse global warming. Id. at 1458. BLM is not exempt from that responsibility.

U.S. coal production increased from 1,029.1 million tons in 1990, to 1,161.4 million tons in 2006, an increase of 12.9 percent. DEIS, 4-118. In the same time, Wyoming coal production increased from 184.0 million tons in 1990 to 444.9 millions tons in 2006, an increase of 242 percent. DEIS, 4-118. As noted in the DEIS, if the coal in the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts are leased and mined, additional greenhouse gases will be released into the atmosphere, further contributing to global warming and the resulting impacts. DEIS, 3-305.

Since 1990, 25 coal leases containing almost 5.8 billion tons of federal coal have been issued following competitive sealed-bid sales in the Powder River Basin. DEIS, 4-4. This mined coal will inevitably be used in coal-fired power plants, DEIS, 3-305, emitting carbon dioxide ($CO_2$), the principal anthropomorphic greenhouse gas. $CO_2$ emissions represent about 84 percent of the total U.S. greenhouse gas emissions. DEIS, 4-115. Of that 84 percent, estimated $CO_2$ emissions from the electric power sector totaled 2,343.9 million metric tons, or about 39.5 percent of total U.S. energy-related $CO_2$ emissions in 2006. DEIS, 4-115. See Massachusetts, 127 S. Ct. at 1446 ("A well documented rise in global temperatures has coincided with a significant increase in the concentration of carbon dioxide in the atmosphere. Respected scientists believe the two trends are related . . . It is therefore a species—the most important species—of a 'greenhouse gas.'").

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The concentration of $CO_2$ in the Earth's atmosphere now exceeds 380 parts per million ("ppm"), more than 80 ppm greater than the maximum levels of at least the last 740,000 years, and perhaps the last 20 million years (Hoegh-Guldberg et al 2007). Because coal-fired power plants are one of the two "largest and fastest growing" sources of carbon dioxide emissions, their greenhouse gas outputs "must be addressed to move emission trends off the Business-as-Usual path and onto something approximating the Alternative scenario" (Hansen 2006; EPA 2007:8) (emphasis added).

Greenhouses gases emissions are within the direct, indirect and cumulative effects that NEPA documents must analyze. 40 C.F.R. § 1508.8. Not only are increased greenhouse gas emissions "reasonably foreseeable" but so too are their climate consequences. 40 C.F.R. §§ 1508.7, 1508.8. As discussed previously, the overwhelming consensus of national and international scientific evidence supports the conclusion that the build-up of greenhouse gases in the atmosphere is contributing to global warming, and that the subsequent changes will adversely affect local, regional and global environments. The PRB coal reserves continue to attract significant attention and continued increase in mine leases and development. As a result, the DEIS should have analyzed the impacts from greenhouse gas emissions from past, proposed, and estimated future coal production. Because the DEIS fails to consider these cumulative impacts, the DEIS must be revised.

Coal-fired power plants are a significant contributor to the generation of greenhouse gases, and consequently, to global warming. The BLM has a responsibility to examine not only the increase in greenhouse gases from the proposed leasing and development of the Wright Area Coal lease areas, but also the regional and global impacts of global warming on resources. The current DEIS neither discusses these impacts nor attempts to quantify them. 5

There is now growing scientific consensus that greenhouse gas emission reductions must begin within the next decade; otherwise, the planet will cross a "tipping point," beyond which "it is virtually certain that there will be large-scale disastrous climate impacts for humans as well as for other inhabitants of the planet," including "extermination of a substantial fraction of the animal and plant species on the planet" (Hansen 2006:15, 30). The impacts of climate change, which are exacerbated by coal leasing and development are much more than "reasonably foreseeable"—and the BLM must analyze them in the DEIS.

**The DEIS Fails to Analyze the Alternatives to Coal Based Energy and the "No Action" Alternative** 2

The DEIS correctly acknowledges that the demand for power is increasing in the U.S. and throughout the world. DEIS, 4-116. According to the North American Electric Reliability Council, peak demand for electricity in the U.S. is expected to double in the next

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22 years. DEIS, 4-116 (citing Associated Press, 2007). There are methods of generating electricity that result in fewer greenhouse gas emissions than burning coal, including natural gas, nuclear, hydroelectric, solar, wind, and geothermal resources. DEIS, 4-116. According to the IPCC, "there is high agreement and much evidence that all stabilization levels can be achieved by deployment of a portfolio of technologies that are either currently available or expected to be commercialized in coming decades...." DEIS, 4-105. The existence of a viable but unexamined alternative renders an EIS inadequate. An agency must look at every reasonable alternative. Alaska Wilderness Recreation & Tourism Ass'n v. Morrison, 67 F.3d 723, 729 (9th Cir.1995)

NEPA mandates that federal agencies "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). Yet the DEIS failed to consider alternative methods. NEPA "requires that alternatives . . . be given full and meaningful consideration." Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1229 (9th Cir. 1988). The BLM failed to meet NEPA's requirements.

Climate change scientists have shown that imminent action is necessary to stabilize and reverse the rapid climate change already occurring. Regardless of what actions are taken to reduce greenhouse gas emissions, some level of global warming is already "in the pipeline," because of past and current emissions. Scientists, however, have generally outlined two broad scenarios based on levels of future emissions: the "Business-as-Usual" scenario and the "Alternative" scenario. Under the alternative scenario, which would yield global warming of less than 1°C in the 21st century, carbon dioxide emissions must moderately decline before 2050 and then have a subsequent steeper decline in order that atmospheric carbon dioxide peaks at 475 ppm in 2100 and declines slowly thereafter. Under the business-as-usual scenario, if emissions continue to rise 2 percent a year, the same rate of increase as the first five years of the 21st century, there will be at least 2°C of global warming by 2100. If warming approaches these levels, the Earth will be a "different planet," and "it is virtually certain that there will be large-scale disastrous climate impacts for humans as well as for other inhabitants of the planet" (Hansen 2006).

The window of opportunity to implement the alternative scenario is exceedingly narrow. If carbon dioxide emissions continue to rise at 2 percent per year for another decade, "the 35% increase [] (between 2000 and 2015) will make it implausible to achieve the Alternative scenario"). At the same time, "the tripwire between keeping global warming less than 1°C, as opposed to having a warming that approaches the range 2-3°C, may depend upon a relatively small difference in human-made direct forcings" (Hansen 2006).

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To comply with NEPA's reasonable alternatives mandate, the BLM was required to include an analysis of the impacts of the proposed lease sale with those of the no action alternative and alternative energy sources. Without the required analysis, the decision makers and the public cannot make an informed decision about the proposed project. The proposed project, with over 2.6 billion tons of coal for lease, makes continued coal power a certainty, even in the face of the impacts on global warming.

**The DEIS Fails to Analyze the Impacts of the Coal Lease Project on Threatened and Endangered Species** 13

Scientific evidence indicates that global warming will adversely affect and jeopardize the continued existence of many threatened and endangered species. The BLM has a duty under the Endangered Species Act to consult with the U.S. Fish and Wildlife Service ("FWS") to ensure that the greenhouse gas emissions that will result from the leasing of the Wright Area Coal LBA will not "jeopardize the continued existence of threatened and endangered species . . . or . . . destroy or adversely modify their designated critical habitat." 16 U.S.C. § 1536(a)(2).

Statutory Background

The ESA "is the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." Tennessee Valley Authority v. Hill, 437 U.S. 153, 180 (1978). The Supreme Court's review of the ESA's "language, history, and structure" convinced the Court "beyond a doubt" that "Congress intended endangered species to be afforded the highest of priorities." Id. at 174. As the Court noted, "the plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, whatever the cost." Id. at 184.

Under section 7(a)(2) of the ESA, every federal agency "shall…insure that any action authorized, funded, or carried out by such agency ("action agency") is not likely to jeopardize the continued existence of the endangered or threatened species or result in the destruction or adverse modification of habitat of such species…determined…to be critical…." 16 U.S.C. § 1536(a)(2) (Section 7 consultation). Agency "action" is defined in the ESA's implementing regulations to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air." 50 C.F.R. § 402.02.

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The Wright Area Coal Leases "Affect" ESA-Listed Species

The scientific community has made enormous strides in its understanding of the nature and scope of anthropogenic global warming, as well as the enormous risks it poses to wildlife, birds, fish, and plants—especially those species that are already imperiled. Numerous species will be affected by global warming. Species that are already imperiled by habitat destruction and fragmentation, pollution, over-harvesting and other factors will be especially prone to extinction as a result of global warming (Hannah et al. 2005:3-14). Therefore, the greenhouse gas emissions of the Wright Area Coal Leases "may affect" such species, triggering the consultation requirement. FWS and the National Marine Fisheries Service ("NMFS") must prepare a biological opinion, which must address whether the project will violate the ESA's prohibition against jeopardizing listed species or adversely modifying their critical habitat. If so, the biological opinion must then identify "reasonable and prudent alternatives," that would sufficiently mitigate the project's impacts below the jeopardy or adverse modification threshold. 16 U.S.C. § 1536(b)(3)(A).

More pronounced global warming effects in the western U.S. pose particular risks to the region's many threatened and endangered species. For example, the "sky island" mountains of Arizona, so named because they contain "islands" of forested habitat rising above a "sea" of desert and grasslands, contain at least 28 threatened or endangered species listed under the ESA. Because many of the mountain ranges are isolated from one another, their forested expanses contain a high proportion of endemic wildlife with highly restricted ranges. The U.S. Forest Service, which administers most of the land within these ranges, recently concluded that rising temperatures associated with global warming had adverse impacts on the sky islands, stating that its plants and wildlife "have not evolved to tolerate these new conditions" (Egan 2007). For species that exist at the higher elevations of these ranges, there may be no opportunity to adapt: as temperatures rise, their habitat will simply disappear. As stated by one prominent scientist, "[a]s the climate warms, these species on top of the sky islands are literally getting pushed off into space." Or in the words of another researcher, "I honestly believe that we are standing at the edge of a very, very large mass extinction, and top-of-mountain species are going to be the first to go" (Erickson 2005).

The highly imperiled Mt. Graham red squirrel, listed as endangered, vividly illustrates this risk. Endemic to a sky island range known as the Pinaleños, its population numbers have already been dramatically reduced through historic habitat loss. Beginning in 1996, the species' only forest habitat has been altered through a series of insect outbreaks driven by warmer and drier conditions caused by global warming (Koprowski et al. 2005). As noted by scientists studying the species, "these impacts are expected to increase with current trends in global climate change" (Koprowski et al. 2005: 491; Ayres and Lombardero 2000). If those

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trends do continue, "[i]n a sense, the topmost community [of the Pinaleños] (the spruce-fir community [will] literally be[] burned up into the sky," causing the Mt. Graham red squirrel to go extinct (Warshall 2007).[2]

The adverse effects of global warming on listed species within the western U.S. are by no means limited to mountaintop species. For example, global warming has been identified as a driving factor in the extirpation of thirty of the eighty peninsular bighorn sheep populations in California, as researchers have correlated those extirpations with those places where the climate has been the warmest and driest (Epps et al. 2004). In addition, decreasing snowfall associated with global warming has been found to negatively affect the Canada lynx, through decreased prey availability and decreased competitive advantage over other carnivores (Carroll 2006).

BLM is Violating Section 7 the ESA

Section 7 of the ESA requires federal agencies to insure that any "action" they authorize, fund, or carry out is not likely to "jeopardize the continued existence of any endangered [ ] or threatened species," or result in the destruction or adverse modification of critical habitats. 16 U.S.C. § 1536(a)(2). As noted in TVA v. Hill, "this language admits of no exception. 437 U.S. 153, 173. The applicable regulations direct agencies, in considering whether formal consultation is required, "to determine whether any action may affect listed species or critical habitat." 50 C.F.R. § 402.14(a). A later portion of the same regulation confirms that agencies must consider the "effects of the action as a whole." 50 C.F.R. § 402.14(c). The "[e]ffects of the action" include the "direct and indirect effects of an action on the species or critical habitat," and "[i]ndirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." 50 C.F.R. § 402.02.

Despite increasing recognition that global warming poses grave threats to both human society and the natural world, and the fact that the mining and burning of coal is one of the paramount contributors to such warming, the BLM continues to approve new coal leases, which will in turn increase greenhouse gas emissions. Coal mining emissions, and their contribution to global warming and species endangerment, are thus an "effect" of the BLM coal leasing program triggering a duty to initiate formal consultation. 1

Under these regulations, federal agencies are required to consider the "total impact" of a proposed project on listed species when consulting under section 7. Riverside Irrigation Dist. v. Andews, 758 F.2d 508, 512 (10th Cir. 1985); North Slope Borough v. Andrus, 642

[2] Global warming and, in particular, longer drought, is also predicted to negatively impact another squirrel species endemic to the eastern U.S., the Delmarva fox squirrel (Hilderbrand et al. 2007).

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F.2d 589, 608 (D.C. Cir. 1980) (agency must look at "all ramifications" of its action). By requiring federal action agencies to broadly assess the effects of their proposed actions, and to consider such effects in the context of independent, baseline harms already occurring to a species, ESA regulations ensure that the section 7 consultation process is not conducted "in a vacuum," and that agencies will "not take action that will tip the species from a state of precarious survival into a state of likely extinction." NWF v. NMFS, 481 F. 3d 1224 (9th Cir. 2007).

By defining "effects of an action" broadly, the ESA regulations do not distinguish between direct and indirect effects—both must be considered during consultation. Indeed, the centrality of indirect effects analysis to the consultation process is highlighted throughout the section 7 regulations. In addition to "effects of the action" encompassing both "direct and indirect effects," the regulatory definition of "action" (actions include those "indirectly causing modifications to the land, water, or air"), "action area," ("all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action") and "destruction or adverse modification" of critical habitat ("a direct or indirect alteration that appreciably diminishes the value of critical habitat") all explicitly include indirect effects. 50 C.F.R. § 402.02 (emphasis added); see also Village of False Pass v. Clark, 733 F.2d 605, 611 (9th Cir. 1984) (consultation must insure that direct and indirect effects of agency action will not jeopardize listed species); Connor v. Burford, 848 F.2d 1441, 1452 (9th Cir. 1988) (section 7 requires preparation of biological opinion analyzing all phases of agency action).

In determining what constitutes an indirect effect, the regulations demand only that they be "reasonably certain to occur," 50 C.F.R. § 402.02, a standard that is consistent with normal tests of proximate causation and foreseeability. While "[p]roximate causation is not a concept susceptible of precise definition . . . It is easy enough [] to identify the extremes." Babbitt v. Sweet Home Chapter of Cmtys. for a Great Ore., 515 U.S. 687, 713 (O' Connor, J., concurring). As such, questions of causation "depend[] to a great extent on considerations of the fairness of imposing liability for remote consequences . . . [A]t the least, [] proximate cause principles inject a foreseeability element into the statute." Id.

Under even the most rigid of formulations, the contribution of coal-burning power plants on global warming are reasonably foreseeable indirect effects of the BLM coal leasing program under ESA regulations.[3] The causal chain at issue is, in fact, short and unattenuated: the BLM permits the lease of coal, the Office of Surface Mining ("OSM")

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[3] As noted above, the actual process of coal mining, and the handling and transportation of the mined coal, both result in significant greenhouse gas emissions, particularly methane. Thus, global warming is also a direct effect of the OSM coal mining program.

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approves the mining of coal under its coal regulatory program, and the mined coal is then utilized at coal-fired generating stations that comprise the largest source of $CO_2$ in the country. The greenhouse gas emissions and their contribution to global warming—which pose greater risks of mass extinctions than that any other activity in human history—are consequently a reasonably foreseeable consequence of the BLM's action. C.f. Friends of the Earth v. Watson, 2005 U.S. Dist. LEXIS 42335 (N.D. Cal. Aug. 23, 2005) (finding causation for standing purposes in action against agencies that provide loans, loan guarantees, and insurance to U.S. companies that invest in large international energy projects which contribute to global warming). It is equally clear that the mining and burning of coal within the U.S., by contributing to global warming, poses threats to listed species far beyond the regulation's de minimis "may affect" threshold. See 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) (section 7 rulemaking in which FWS and NMFS interpreted the "may affect" threshold for initiation and reinitiation of consultation as a very low bar, finding that "any possible effect, whether beneficial, benign, adverse, or of an undetermined character, triggers the formal consultation requirement.") (emphasis added). Consequently, greenhouse gas emissions from coal-fired power plants, and their effect on global warming and listed species, are an indirect effect of the BLM's lease sales compelling formal consultation.

In addition to the requirement to consider greenhouse gas emissions as an indirect effect of the coal lease sale, the ESA regulations create an independent duty on the BLM to consider coal-fired power plant emissions as an interrelated and interdependent action. "The test for interrelatedness or interdependentness is 'but for' causation: but for the federal project, these activities would not occur." Sierra Club v. Marsh, 816 F. 2d 1376, 1387 (9th Cir. 1987) (quoting 51 Fed. Reg. 19,932 (1986)). Here, U.S. coal-fired power plants would not and could not operate without the domestic coal mining program possible through coal leases administered by the BLM. In recent years, approximately 90 percent of coal mined in the U.S. has been utilized at domestic power plants, while importation has always "represented a negligible share of U.S. coal," and has not risen above 3.5 percent of domestic consumption for the past 35 years (EIA 2006:17; EIA 2007:3). Because these coal-fired power plants are interrelated to, and interrelated with the BLM coal leasing program, their effects on threatened and endangered species present an additional and independent basis compelling the BLM to initiate consultation. 6

Species of Concern

The Greater sage-grouse (*Centrocercus urophasianus*) is a known species of concern throughout the West, and a BLM sensitive species, relies on sagebrush for food, cover, and shelter habitat year round. ES-49, ES 3-198. In recent surveys, a total of 10 safe-grouse leks have been documented on and within two miles of the six combined general analysis areas. ES-49. With four of the ten leks active and classified as occupied, the mining 12

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impacts, including loss of nesting habitat and disturbance to breeding activities presents significant concern. ES-49. The mining of the six LBA tracts will reduce potential habitat for wildlife species, including the sage-grouse. The BLM must analyze in greater detail the impacts of the proposed LBAs on the on the imperiled sage-grouse.

**Conclusion**

Based on the aforementioned deficiencies and concerns raised, we believe the BLM must revise the DEIS and update it to include an accurate, current, and complete discussion of the impacts of greenhouse gas emissions from the LBAs.

All references cited in the text are listed in the Literature Cited section below. We request that the BLM carefully review and consider these important references. A CD with the scientific studies will be provided at a later date and under a different cover. They are also part of the administrative record for this rulemaking.

Thank you very much for your consideration of these comments. Please contact me at (202) 682-9400 or at the address on this letterhead if you have any questions or concerns.

Sincerely,

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August 25, 2009

VIA ELECTRONIC MAIL
HARD COPY w/ATTACHMENTS TO FOLLOW VIA CERTIFIED CLASS MAIL
Wyoming High Plains District Office
Bureau of Land Management
Attn: Sarah Bucklin
2987 Prospector Drive
Casper, Wyoming 82604
casper_wymail@blm.gov

Re: Draft Environmental Impact Statement for the Wright Area Coal Lease Applications

Dear Ms. Bucklin:

These comments are submitted on behalf of the Center for Biological Diversity ("Center") in response to the Bureau of Land Management's Draft Environmental Impact Statement ("DEIS") for the Wright Area Coal Lease Applications.[1] The Center is a non-profit conservation organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 225,000 members and supporters throughout the western United States and around the world, and offices in New Mexico, Arizona, California, Nevada, Oregon, Alaska, Illinois, Minnesota, Vermont, and Washington, D.C. The Center also works to reduce greenhouse gas emissions to protect biological diversity, our environment, and public health.

## Introduction

As stated in the Draft EIS, BLM is proposing to hold a competitive coal lease sale and issue a maintenance lease to the successful bidder(s) for the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine Lease by Application ("LBA") Tracts, which altogether include approximately 18,021.73 acres of public land containing approximately 2.570 billion tons of federal coal.

As explained below, the Draft EIS for this proposal does not adequately disclose and take a hard look at the environmental consequences of the Wright Area leases. Mining the Wright Area LBA Tracts as proposed would result in significant impacts to air and climate, water, soil, species, and other resources that were not considered in the Draft EIS. While the Draft EIS is

[1] U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, *Draft Environmental Impact Statement for the Wright Area Coal Lease Applications* (June 2009) ("DEIS" or "Draft EIS").

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inadequate in a number of respects, without question some of its most troubling aspects are its failure to disclose information about and analyze changing environmental baseline conditions due to global warming, the combined effect of climate change and the Wright Area leases to affected resources, and the LBA Tracts' substantial contribution to the problem of global warming, with billions of tons of greenhouse gases being released into the atmosphere as a result of BLM actions. The Draft EIS also fails to demonstrate conformity with standards under the Clean Air Act.

With literally the fate of our planet at stake, the proposed leasing should be shelved and a phase-out of all coal-related development commenced immediately, particularly on public lands. At a minimum, the DEIS (or a supplemental environmental impact statement) must be revised and recirculated to properly evaluate the global warming impacts of all reasonably foreseeable consequences of leasing the LBA Tracts.

## DISCUSSION

### I. The Proper Context for an Analysis of the Wright Area Project is The Climate Crisis.

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#### A. The Climate Crisis is Worsening.

Climate change is already changing weather patterns, intensifying drought, causing increased fire danger, melting Arctic sea ice, causing sea level rise and ocean acidification, and creating a host of additional dangers for people and wildlife.[2] Recent observations show greenhouse gas levels and effects on the environment that are generally at the upper bounds of, or even outstripping, recent projections.[3] Some of these impacts make clear that at today's greenhouse gas concentrations we are already beyond the natural climate variability experienced over the last several thousand years, suggesting negative climate consequences of an unpredictable magnitude yet to come.[4]

Federal scientists understand that climate change is happening and that its impacts will continue to grow. Federal agencies have issued clear and forceful reports on the magnitude of the crisis, including in two recent documents: the Global Change Research Program's June 2009 report, *Global Climate Change Impacts in the United States* ("GCRP Report") and the Environmental Protection Agency's April 2009 *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* ("GHG TSD"). These documents describe the impacts of climate change to human health, ecosystems, and the economy, including impacts that are already being documented in the U.S., and

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[2] For the most comprehensive and up-to-date statement of the impacts of climate change in the U.S., see U.S. Global Change Research Program, *Global Climate Change Impacts in the United States* (June 2009) ("GCRP Report") available at http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts. For the most up-to-date statement of the impacts of climate change internationally, see Copenhagen Climate Congress, *Synthesis Report – Climate Change: Global Risks, Challenges and Decisions* (Mar. 2009) ("Copenhagen Report"), available at http://climatecongress.ku.dk.

[3] *Id.*

[4] *Id.*

projections for impacts that will likely get far worse. These reports show that already, temperatures are warmer, temperature extremes have shifted upward, precipitation patterns have changed, sea levels have risen, oceans have become more acidic, and glaciers and Arctic ice have melted.[5] Indeed, much of Wyoming, the state where the proposed leases are located, has already experienced a 2 to 3°F increase in annual average temperature compared to the 1961-1979 average.[6]

The overwhelming weight of scientific evidence leaves little doubt that unless we rapidly and completely curtail greenhouse gas emissions – primarily from burning coal, oil, and natural gas[7] – the U.S. will continue to warm at an accelerating rate and greater than the global average, and experience greater-intensity heat waves more frequently as well as changes in precipitation patterns, more frequent and severe droughts, greater-intensity hurricanes, and accelerating ocean acidification.[8]

Indeed, scientists are telling us that global greenhouse gas atmospheric concentrations are already too high, and that to avoid "severe, widespread and irreversible impacts," levels of greenhouse gases must soon be stabilized no higher than levels already reached.[9] It cannot be over-emphasized that the Earth is already past the danger point. Even stabilizing at today's atmospheric concentrations of greenhouse gases is no guarantee that severe, widespread, and irreversible climate impacts can be avoided.[10] The inescapable conclusion is that to assure a livable world we must bring greenhouse gas emissions down drastically, starting immediately. Further postponing action decreases the Earth's chances of preventing catastrophic climate change and greatly increases the eventual costs of stabilization.[11] Inaction now inevitably means more suffering and even greater economic losses in the not-too-distant future.

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## B. Coal's Unique Role in the Solution to the Climate Crisis

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When viewed in the context of all greenhouse gases emitted by all sectors in the U.S. economy – including electricity generation, transportation, industry, and agriculture – burning coal to produce less than half of the nation's electricity represents more than one-third of all net U.S. emissions.[12] Compared even to oil or gas, coal emits 31-84 percent more carbon dioxide per unit of energy delivered.[13] Phasing out the use of coal is a critical first step toward stabilizing the climate. There are two principle reasons for this.

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[5] *See, e.g.*, GHG TSD at ES2-ES3.
[6] *See* GCRP Report at 28.
[7] *See id.* at 9.
[8] *See, e.g.*, GHG TSD at ES3-ES4.
[9] GCRP Report at 23.
[10] *Id.*
[11] Copenhagen Report at 6.
[12] EPA, *2009 U.S. Greenhouse Gas Inventory Report* (April 2009) at http://www.epa.gov/climatechange/emissions/usinventoryreport.html.
[13] EIA, *Official Energy Statistics from the U.S. Government*, at http://tonto.eia.doe.gov/ask/environment_faqs.asp.

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One, coal has the worst global warming emissions profile of any conventional fossil fuel.[14] Production of one million British thermal units ("BTU") of energy from burning natural gas produces 117 pounds of $CO_2$, while the same energy production from sub-bituminous coal mined in the Powder River Basin produces 213 pounds of $CO_2$.[15] Thus, for no gain in energy output, coal from Wyoming over natural gas means 82 percent more greenhouse gases are pumped into the atmosphere.[16]

Meanwhile, scientists now say that if the world continues on a business-as-usual path for even another decade without initiating phase out of unconstrained coal use, the prospects for avoiding a dangerously large, extended overshoot of the 350 ppm level will be dim, and the prospects for a near-term return of atmospheric composition beneath the tipping level for catastrophic effects virtually eliminated. In a seminal paper, Dr. Hansen and eight co-authors state that the curtailment of coal use is critical if we want to "preserve a planet similar to that on which civilization developed and to which life on Earth is adapted ... ."[17] They warn that a failure to do so may bring "irreversible, catastrophic effects." And if we burn all the coal, Dr. Hansen has warned that "there is a good chance that we will initiate the runaway greenhouse effect" – *i.e.*, a relatively rapid increase of $CO_2$ concentrations in the atmosphere that can stimulate the potentially unstoppable release of massive amounts of stored carbon and methane into the atmosphere.[18]

The second reason for prioritizing the elimination of coal is that renewable sources of energy and energy efficiency measures are available to replace coal use *now*. In each of the last four years, more new electric generating capacity in the U.S. was added by renewable energy sources than by coal.[19] According to the latest available figures, comparing April of 2009 with April 2008,

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[14] Processing oil from tar sands and from shale, which has been approved to occur in Colorado, Utah, and Wyoming by the Department of Interior and BLM, will have climate emissions portfolios worse than coal, and include significant additional impacts to air and water quality. *See* Hansen, J. 2008. Climate Threat to the Planet: Implications for Energy Policy and Intergenerational Justice. Bjerknes Lecture (slides), American Geophysical Union (stating that "...if we burn all the coal, there is a good chance that we will initiate the runaway greenhouse effect. If we also burn the tar sands and tar shale (a.k.a. oil shale), I think it is a dead certainty.").

[15] EIA, *Official Energy Statistics from the U.S. Government.*

[16] On top of that, the U.S. coal industry does not efficiently use coal as a source of energy. For example, although coal is also the dirtiest conventional fossil fuel used in Japan, it is at least used more efficiently; a kilowatt-hour of coal-fired power produced in Japan creates 418 grams of $CO_2$, in comparison to the 625 grams of $CO_2$ that are emitted to produce a kilowatt-hour of electricity in the U.S.[16] In the U.S., older coal-fired power plants can often avoid installing air pollution control equipment that is required on newer plants. For this reason, 145 of the dirtiest coal-fired power plants in the U.S. still in operation today were built in the 1940s or earlier. Pope, C., *The Clean Air Act story: back to the beginning*, Grist (Aug. 10, 2009) available at http://www.grist.org/article/2009-08-10-the-clean-air-act-story-back-to-the-beginning/.

[17] Hansen, J., et al., Target Atmospheric $CO_2$: Where Should Humanity Aim?, The Open Atmospheric Science Journal 217, 229 (2008).

[18] Hansen, J. (2008) (Bjerknes Lecture (slides)). In Congressional testimony more than 20 years ago, Dr. Hansen warned that climate change could not be ignored by the world, leading the *New York Times* to publish a story under the headline, "Global Warming Has Begun, Expert Tells Senate." Senate Energy and Natural Resources Committee, 100th Congress (June 23, 1988); Philip Shabecoff, *Global Warming Has Begun, Expert Tells Senate*, New York Times (June 24, 1988).

[19] *See, e.g.*, Worldwatch Institute, *Wind Power Increase in 2008 Exceeds 10-Year Average Growth Rate* (May 7, 2009) at http://www.worldwatch.org/node/6103.

U.S. coal-fired generation was down 14 percent compared to the previous year, while wind generation surged ahead by 35 percent during the same period.[20] Renewable energy now generates 11 percent of our nation's electricity, and rising.[21] The trend away from fossil fuels will likely continue and accelerate.[22]

Energy efficiency is widely recognized as the most important substitute for coal. The National Academy of Sciences, in a new report, finds that U.S. projected energy demands could be reduced by at least 15 percent by 2020 and 30 percent by 2050 through energy efficiency.[23] A detailed new report by global consulting firm McKinsey and Associates finds even more savings. Non-transportation energy use in the U.S., primarily electricity, could be reduced 23 percent from projected levels by 2020 with a net savings to the economy of about $700 billion.[24] The efficiency measures employed only include those that save costs and do not even include a price on carbon. Yet another report finds that by employing efficiency measures, U.S. electricity consumption by 2050 could fall 30 percent below today's levels, despite significant growth in demand.[25] With committed employment of efficiency measures and continuing growth of renewable industries at current rates, all coal-fired plants could be shuttered within the next several decades, without any disruption to the U.S. electricity supply.

Predictions of the power of efficiency are backed up by an impressive, real world example of effective implementation of widespread efficiency measures. About three decades ago, California per capita electricity consumption was similar to the national average as a whole. After years of pursuing efficiency goals, the state has reduced its peak power requirements by 12 GW, at a cost of about 2-3 cents per kW-hr.[26] California per capita consumption today runs about 40 percent below the national average, and California now gets only one percent of its

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[20] EIA, *Electric Power Monthly* (July 2009) at http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html?featureclicked=3&.

[21] *Id.* Of course, to truly be "green" renewable energy projects must be sited in areas that are already disturbed, or near degraded private lands and existing infrastructure and wastewater sources, in order to avoid unnecessary impacts to threatened and endangered species, sensitive environmental areas and the water that sustains them as well as human communities.

[22] Early in the process of building a new power plant, a developer needs to enter into a "queue" for interconnection to transmission capacity. By looking at which types of projects have entered the interconnection queue, it is possible to see what sources of electricity are likely to come on line in the next few years. According to a new Department of Energy report, there are almost 300 GW of wind power projects in the queue. Coal has less than 50 GW of generation in the queue. Planned renewables far outpace all fossil fuel and nuclear sources of likely new power combined. U.S. Department of Energy, *2008 Wind Technologies Market Report* (July 2009) at 13, available at www1.eere.energy.gov/windandhydro/pdfs/46026.pdf. And given that 100 coal-fired power plants have been cancelled since 2002, even the possible addition of 45 GW of new coal power is surely a gross overestimate of future increased generation. *Utah Coal Plant Scuttled, 100th in U.S. Since 2002*, Reuters (July 9, 2009) at http://www.reuters.com/article/GCA-GreenBusiness/idUSTRE5684UN20090709.

[23] National Academy of Sciences, *America's Energy Future: Technology and Transformation* (press release) (July 2009) available at http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12091.

[24] Granade, H.C., et al., *Unlocking Energy Efficiency in the U.S. Economy*, McKinsey and Associates (July 2009) available at http://www.mckinsey.com/clientservice/electricpowernaturalgas/US_energy_efficiency/.

[25] Greenpeace International, *Energy Revolution: A Sustainable USA Energy Outlook* (March 2009) at 6.

[26] Romm, J., *If Obama Stops Dirty Coal As He Must, What Will Replace It?*, Climate Progress (Feb. 19, 2009) available at http://climateprogress.org/2009/02/18/obama-replace-dirty-coal-nuclear-efficency-cogeneration-wind-solar-csp-biomass-cofiring/.

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electricity from coal.[27] Dozens, if not hundreds, of our oldest and dirtiest coal-fired plants could be closed quickly if utility incentives were restructured to promote efficiency measures, like they have been in California, instead of continuing to provide incentives to install new power plants, as in much of the nation. We continue to use coal by choice, not by necessity.

### C. The Unique Role of Public Lands in the Climate Crisis

Public lands provide some of our most critical refuges for species in an era of ecosystem onslaught due to climate change. They are the last, best places where natural processes remain functional.[28]

As the effects of climate change grow and intensify, it will be the ecosystems with the greatest resiliency that will best be able to survive these unprecedented changes. A healthy old-growth forest will support far more biological diversity in a warming world than a corporate tree farm. The seeps and springs of a natural desert might still provide water necessary for life, where nearby lands pumped dry for mining or irrigation will not. In an era of potentially massive species extinction, resilient ecosystems on public lands may be the only hope for many species. Public lands can play a critical role in providing migration corridors for species on the move, as they will provide large areas of natural forest or prairie or desert in public ownership can provide useful corridors for migration, whereas the broken landscapes of private ownership, development, agriculture and industrialization often cannot.

Public lands will play one other critical role in the face of climate change: sequestration. About one-eighth of all U.S. greenhouse gas emissions are currently absorbed by U.S. lands and the plants that grow there.[29] If, as described above, the U.S. fulfills the President Obama's commitment to reduce total emissions by 80 percent by 2050, that same absolute level of carbon absorption by terrestrial ecosystems will amount to a 40 percent absorption of emissions in the future.[30] Public lands could be managed now to absorb even more carbon dioxide per acre than current rates. Or they could be degraded further, by more mining, more logging, drilling and grazing, reducing this critical natural sequestration function.

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[27] American Coalition for Clean Coal Electricity, *America's Power – The Facts*, available at http://www.americaspower.org/The-Facts.

[28] DEIS at ES-51.

[29] GHG TSD at 10.

[30] In his "Remarks on the Declaration by the Major Economies Forum on Energy and Climate Change in L'Aquila Italy" on July 9, 2009, President Obama recently committed the nation to holding climate change in check, stating:

> We all agreed that by 2050 developed nations will reduce their emissions by 80 percent, and that we will work with all nations to cut global emissions in half. This ambitious effort is consistent with limiting global warming to no more than 2 degrees Celsius, which, as our declaration explicitly acknowledged for the first time, is what the mainstream of the scientific community has called for.

The President added that one of his Administration's "highest priorities" is to "drive a clean energy transformation of our economy… ."

## II. The Purpose and Need Warrants Adoption of the No Action Alternative. 1

It is a not easy to identify the "purpose and need" of the Wright Area project from the two pages of prose under that heading.[31] Nevertheless, BLM does appear to suggest that the purpose and need for this project stems from a need to continue to implement two Congressional mandates, the Federal Land Policy Management Act, 43 U.S.C. § 1701, *et seq.* ("FLPMA") and the Energy Policy Act of 2005 ("EPAct").

Only the "No Action" alternative fulfills the stated purpose and need. As the DEIS notes, FLPMA requires BLM to "manage public lands for multiple use so that the lands are utilized in the combination that will best meet the present and future needs of the American people." DEIS at 1-16. As discussed below, the Wright Area lands proposed for mining under the Proposed Action can best meet the needs of present and future Americans if the coal is left in the ground and the carbon is kept out of the atmosphere. By proposing to allow the mining of over 2.5 billion tons of federal coal in the Wright Area lands, BLM is proposing to use such lands in direct contradiction to the most basic needs of future Americans: an environment on Earth that is hospitable to life.

Likewise, the DEIS notes the important goals of the EPAct that implicate this project: promote energy efficiency, ensure secure, affordable and reliable domestic energy, and add energy supplies from diverse sources. *Id.* As also demonstrated below, these needs are best met by leaving the coal in the ground. Given coal's many tremendous costs to society, coal is not "affordable" and works to prevent energy efficiency. In addition, coal's role in creating global warming threatens U.S. security; at about 46 percent of domestic electricity generation, further coal mining works against diversifying U.S. energy supplies.

## III. The Draft EIS Fails to Adequately Disclose and Take a Hard Look at the Impacts of the Wright Area Leases. 6

### A. The DEIS Fails to Account for all Greenhouse Gases.

The DEIS fails to adequately catalogue the greenhouse gas emissions that will result from issuance of the leases. While the DEIS states that "Section 3.4.5 contains estimates of greenhouse gas emissions resulting from the combined mine operations", in fact, Section 3.4.5 reads simply, in its entirety, "No residual impacts to air quality would occur following mining and reclamation."[32] This is unacceptable; whether intentional or an oversight, this error mandates recirculation of a DEIS that adequately discloses and takes a hard look at the direct, indirect, and cumulative effects of the leases, or issuance of a SEIS, whereby the public is given an actual opportunity to review BLM's promised estimates of project climate emissions, analyze those estimates, and comment on the estimates and implied impacts.

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[31] DEIS at 1-16.
[32] *Id.* at 4-109, 3-85.

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B. The DEIS Does Not Adequately Estimate, Disclose, or Consider the Environmental Consequences of the Greenhouse Gas Emissions Resulting from Issuance of the Leases. 6

Section 3.18.2 attempts a rough estimate of mining-related greenhouse gas emissions, but this estimate is inadequate as it excludes the largest source of emissions from this project: the burning of the coal that will be mined.[33] When analyzing greenhouse gas emissions, the DEIS would have a blindfold on as to the use for the coal, as if it is somehow uncertain and cannot be estimated or analyzed precisely. Yet in the DEIS, BLM recognizes that approving this project is an irreversible and irretrievable commitment of resources that are "*to be used for electrical power generation.*"[34]

Indeed, there can be no serious doubt that coal mined in the lease areas will be combusted for power generation. Therefore, no EIS is complete without analyzing the impacts of burning that coal, including impacts on the climate. *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549-50 (8th Cir. 2003) (when the *nature* of the effect is reasonably foreseeable but its *extent* is not, we think that the agency may not simply ignore the effect"); *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008) (greenhouse gas emissions are "unquestionably subject to NEPA's cumulative impacts requirements"). The first step in that analysis must be an inventory of emissions, and that inventory, once it is disclosed, will show billions of tons of $CO_2$ would be released as a result of this project, thousands of times more than the DEIS admits.[35] A SEIS, with an opportunity for public comment, is therefore the only solution for addressing this otherwise unlawful omission.

Even when climate impacts are described in the DEIS, the best available science is not applied. For example, the DEIS asserts that, "[e]xisting climate prediction models are not at a scale sufficient to estimate potential impacts of climate change within the Powder River Basin."[36] And, "[t]ools necessary to quantify incremental climatic changes associated with those factors for the projected development activities in the PRB are presently unavailable."[37] These are the same misleading incorrect assertions that were made about other air quality models a generation ago.[38] Similarly, quoting a 22 year-old study on global temperature changes omits the top ten hottest years in the global temperature record.[39] Trying to attribute global warming to solar activity changes – without even citing one peer-reviewed study – would be laughable if it were not so frightening for its display of scientific ignorance.[40]

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[33] *Id.* at 3-304.
[34] *Id.* at 3-308 (emphasis added).
[35] *Id.* at 3-307.
[36] *Id.* at 4-110.
[37] *Id.*
[38] As an example, we cannot say which people exactly will actually die from an increase in ozone precursors. We cannot say exactly how many additional lives will be lost from a given increase in emissions. Nonetheless, we clearly know enough to place controls on industrial processes known to emit these dangerous ozone-forming pollutants.
[39] DEIS at 4-112.
[40] *Id.; see also* 40 C.F.R. § 1502.24 (An agency must also insure the professional integrity, including scientific integrity, of the discussions and analyses included in its EIS.).

Likewise, the discussion on greenhouse gas emissions in Section 4.2.14 never actually describes the cumulative environmental consequences of this action on climate change. Instead, the section is largely devoted to a description of the role that coal plays in electricity generation now, and how important that role will remain in the future. The section is largely used to argue that because emissions from this project are small relative to global emissions, PRB emissions are of no consequence. This is the opposite of disclosure and analysis of cumulative impacts, which is required under NEPA. *Ctr. for Biological Diversity v. NHTSA*, 538 F.3d at 1217 (greenhouse gas emissions are "unquestionably subject to NEPA's cumulative impacts requirements"). Additionally, BLM's conclusion that disapproval of mining these 2.5 billions tons of coal, compared to mining them, would not "result in a decrease of U.S. CO2 emissions attributable to coal-burning" is stunning.[41] Where does BLM think greenhouse gas emissions come from if not mining coal and burning it? This degree of denial as to the effects of the Proposed Action has no place in a DEIS.

When assessing the future of U.S. coal use, BLM uses two models, both of which assume that coal use continues to grow at the same rate other sources of electricity grow, despite all evidence from the last decade to the contrary.[42] This is also despite the President Obama's pledge to transform the nation's energy infrastructure. While the President, world leaders and scientists call for a rapid decrease in carbon emissions, BLM continues to assume a high rate of carbon emissions growth for the next two decades and beyond.[43] Only by continuing to hold on to outdated views and ignore current science could BLM even contemplate approval of this project. 14

Furthermore, the Energy Information Administration ("EIA") has disavowed the very analysis on which BLM relies. A new EIA analysis was published in March 2009, months before this DEIS was published.[44] If BLM would have sought out this updated information before DEIS publication , it would have learned that the EIA is now predicting "much less new coal capacity" in future decades than previously projected, coal providing about one-third of the growth that BLM projects. Prediction of total energy growth is reduced to about 0.5 percent per year, far less than BLM estimates in the DEIS. Of course, new legislation or a new international treaty would require even greater scaled back predictions for coal demand. And as noted above, coal demand in the last year has dropped by 14 percent, while renewables have surged forward.[45]

The DEIS also excludes any and all consideration of combustion by-products like black carbon, or soot, which is generated (among other things) by combustion of fossil fuels including coal. Black carbon is a particulate that deposits to the surface of the Earth, often in Alaska, Greenland, or the Arctic Ocean, within about a week of its emission, which usually occurs in the northern hemisphere. Black carbon influences the climate both in the atmosphere and at the surface, before and after it is deposited; the contrast between black carbon, the darkest aerosol, and snow and ice, the brightest surfaces of the planet, causes black carbon to absorb sunlight and to warm 16

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[41] *Id.* at 4-122.
[42] *Id.* at 4-119.
[43] *Id.*
[44] EIA, *Annual Energy Outlook 2009* (March 2009) Executive Summary available at http://www.eia.doe.gov/oiaf/aeo/execsummary.html.
[45] EIA, *Electric Power Monthly* (July 2009) at http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html?featureclicked=3&.

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the Arctic atmosphere by approximately the same amount as human-injected $CO_2$ in spring and summer, when snow and ice are most vulnerable to melting.[46] The DEIS must be revised and recirculated to include black carbon in its analysis of climate impacts.[47]

In yet another glaring omission, the DEIS also fails to note the effect climate change is already having on the project area environment. Chapter 4 of the DEIS claims that Chapter 3 of the DEIS does so, but it is not apparent where any such discussion may be found.[48] Significant changes to temperature and precipitation regimes, well documented by scientists, are completely ignored in the section of the DEIS devoted to describing climate in the area.[49] Some of these existing changes to climate are noted below, but such description cannot satisfy BLM's responsibility to disclose and consider climate change as part of the environmental baseline for the area. NEPA requires BLM to set forth such baseline environmental conditions, as there is no way to determine what effect on the environment the leases will have without doing so, and consequently, no way to comply with NEPA. *Half Moon Bay Fisherman's Marketing Ass'n v. Carlucci,* 857 F.2d 505, 510 (9th Cir. 1998); *see also Robertson v. Methow Valley,* 490 at 349 (NEPA's fundamental purposes are to guarantee that: (1) agencies take a "hard look" at the environmental impacts of their actions by ensuring that they "will have available, and will carefully consider, detailed information concerning significant environmental impacts;" and (2) "the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision."); *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1166 (9th Cir. 2003) (NEPA "emphasizes the importance of coherent and comprehensive up-front environmental analysis to ensure informed decision-making to the end that the agency will not act on incomplete information, only to regret its decision after it is too late to correct.") 6

### C. The DEIS Fails to Disclose or Consider the Current and Projected Impacts of Climate Change.

The DEIS fails to adequately disclose and discuss the myriad ways in which climate change impacts human safety and public health. Because NEPA requires BLM to fully disclose the environmental consequences of its actions, BLM was required to rigorously explore both how ongoing climate change has impacted the environmental baseline conditions in the lease area – 17

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[46] Zender, C.S. 2007. Arctic Climate Effects of Black Carbon. Written testimony to the Oversight and Government Reform Committee, U.S. House of Representatives. *See also* Schwartz, J. 2007. Testimony for the Hearing on Black Carbon and Climate Change House Committee on Oversight and Government Reform United States House of Representatives.

[47] *See Half Moon Bay Fishermans' Marketing Ass'n v. Carlucci*, 857 F.2d 505, 508 (9th Cir. 1988) (quoting *California v. Block*, 690 F.2d 753, 770-71 (9th Cir. 1982)) ("NEPA's public comment procedures are at the heart of the NEPA review process" and "reflect 'the paramount Congressional desire to internalize opposing viewpoints into the decision making process to ensure that an agency is cognizant of all the environmental trade-offs that are implicit in a decision.'" Thus, "[i]t is only at the stage when the draft EIS is circulated that the public and outside agencies have the opportunity to evaluate and comment on the proposal" and "[n]o such right exists upon issuance of a final EIS".); *id.* ("an agency's failure to disclose a proposed action before the issuance of a final EIS defeats NEPA's goal of encouraging public participation in the development of information during the decision making process").

[48] DEIS at 4-110.

[49] *See id.* at 3-10 to 3-11.

including in the ways described below – and *how those changes will combine with and exacerbate the impacts from the lease sale approval.* However, this was not done.



### 1. More frequent and intense heat waves

Among weather-related causes of death in America, heat ranks as number one. For example, in 1998 in the U.S., between 5,000 and 10,000 Americans are believed to have died from heat waves and attendant air quality degradation.[50] Climate change is expected to significantly increase the number, duration, and severity of heat waves in America.[51]

By the end of the century, major U.S. cities can expect to experience two to four times as many heat wave days, resulting in two to four times as many heat-related deaths, or even more.[52] As one particularly stark example, depending on emissions scenarios, by the end of the century, many areas throughout Texas, Louisiana, Oklahoma, Arizona and California can expect more than 100 days in an average year with temperatures over 100°F.[53] Even large portions of states like Virginia, Illinois, and South Dakota could see an average of around 50 days per year over 100°F.[54] The Wright Area can expect about 75 days a year over 90°, far outside the normal range.[55]

A growing population of people over the age of 65 could be especially vulnerable. Heat waves lead not only to thousands of deaths, but increased illness among many, including ailments like heart attacks.[56] When currently-young citizens of Wyoming retire, they can expect heat waves that today occur once every 20 years or so to occur almost on annually.[57] In producing these estimates, researchers are assuming that people will become somewhat accustomed to this increased heat – otherwise, heat-related deaths will climb to levels even higher.[58]

### 2. Increases in smog

Increased ozone concentrations lead to lung tissue damage, worsened asthma, and premature death.[59] This is especially true for people who exercise outdoors and for children.[60] Unfortunately, "hot" and "smoggy" go hand in hand. The chance that ground-level ozone pollution, the primary constituent of smog, exceeds safety guidelines is a strong function of daytime temperatures.[61] Already 175 million Americans live in counties with unsafe ozone

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[50] GCRP Report at 102.
[51] *Id.* at 90
[52] *Id.* at 91.
[53] *Id.* at 90.
[54] *Id.*
[55] *Id.* at 34.
[56] GHG TSD at 70.
[57] GCRP Report at 33.
[58] Increasing winter temperatures can be expected to reduce cold-related deaths. Unfortunately, researchers believe that the reduction of winter deaths will not be able to match the increase in summer heat-related deaths. *See id.* at 92.
[59] *Id.* at 75.
[60] GCRP Report at 93.
[61] GHG TSD at 76.

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levels.[62] Global warming will make ozone pollution worse.[63] Hot air tends to be stagnant air that sits over cities.[64] On top of the heat, increased greenhouse gas emissions are strongly associated with increased smog-forming emissions.[65]

A future increase in greenhouse emissions compared with a future of decreased emissions presents strikingly different worlds when it comes to ozone.[66] Under a decreased emissions scenario, a small increase in temperatures is more than offset by reductions in ozone precursors, leading to a drop in smog concentrations across much of the country. With a high emissions scenario, both increasing emissions and rising temperatures lead to a tremendous degradation in air quality across most of the country. The implications for public health could be profound, especially given that more than one-half of the country already lives in areas that are not meeting federal air pollution quality standards, including counties that now border Wyoming.[67] Some studies have even found that the ozone problem could extend into spring and fall seasons, further amplifying negative health impacts.[68]

Under a high emissions scenario, Wyoming can expect a severe worsening of its growing ozone problem. Projections for the end of this century expect average summertime ozone levels in the project area to increase by about 8 to 10 parts per billion.[69] This increment, on top of existing ozone levels in the project area, would be enough to put the Wright Area into non-attainment with the 2008 8-hour ozone standard.[70] These impacts will converge with existing ozone problems that are discussed further below. 3

### 3. More frequent and intense flooding and hurricanes

Global warming has changed precipitation patterns in many ways. Rain now tends to fall in more extreme events, leading to more frequent and disastrous floods in many areas of the country.[71] Tropical cyclone activity is also on the increase.[72] Increased hurricane activity, combined with rising sea levels, leads to higher storm surges and more dangerous flooding. The increased flooding that results from these processes can create a variety of human health problems. 6

Flooding can expose millions of people to increased rates of infectious and skin diseases and can lead to long-term degradation of water quality due to accidental releases of hazardous chemicals and heavy metals.[73] One way in which this problem is greatly exacerbated is through the problem of combined sewer overflow. In the U.S., 770 cities, including many of our nation's

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[62] American Lung Association, *State of the Air: 2009*, available at http://www.stateoftheair.org/2009/key-findings/executive-summary.html.
[63] GHG TSD at 75.
[64] *Id.* at 76.
[65] *Id.*
[66] *See* GCRP Report at 92.
[67] *Id.*
[68] GHG TSD at 78.
[69] GCRP at 92.
[70] DEIS at 3-66.
[71] GHG TSD at 72.
[72] *Id.*
[73] *Id.*

largest, pump raw sewage through the same pipes that deal with storm overflow.[74] When precipitation is particularly heavy, the flow that combines city street run-off, human sewage, and industrial waste overwhelms treatment facilities and runs into nearby bodies of water. Unfortunately, these lakes and rivers are often drinking water sources or sites of recreation activities, like swimming and fishing. The number of days with very heavy precipitation has increased across the U.S. in the last half century, with the Northeast being particularly hard hit.[75] By the end of this century, global warming could cause the number of precipitation events that overwhelm treatment facilities to more than double.[76]

### 4. More frequent and intense drought and wildfire

Different areas of the country are likely to experience different changes in precipitation patterns, leading to different kinds of extremes. For example, northern latitudes have experienced increased precipitation, falling in extreme events.[77] That trend will likely continue. Subtropical latitudes, on the other hand, like the southern tier of U.S. states, are predicted to experience increased drought, perhaps becoming so severe as to leave the Southwest in a permanent "Dust Bowl."[78]

But even regions with longer and more severe drought may experience increased flooding. This can happen due to changes in rainfall patterns that lead to long intervals of drought, capped by severe storms, thus, drought and flooding. And like the flooding described above, drought has consequences for public health.

Although people do not generally die from drought, drought has economic consequences that can affect people's health and well-being. Drought, especially when combined with increased insect and disease attacks, can lead to increased forest fire danger.

The size, frequency, and severity of U.S. wildfires have increased and are predicted to continue to do so.[79] Forest fires can affect air quality across hundreds of square miles for months at a time, leading to increased emergency room visits and eye and respiratory ailments.[80] Forest and brush fires can destroy lives, homes, and livelihoods. And forest fires are often at their worst during heat waves, at times likely to coincide with stagnant, deadly air.

Northeastern Wyoming has already experienced a measurable reduction in rainfall in the last half-century.[81] While the area might receive more rain in the future during winters, predictions are for drier summers and falls.[82]

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[74] GCRP Report at 94.
[75] *Id.* at 44.
[76] *Id.* at 95.
[77] *Id.* at 44.
[78] GHG TSD at ES-3
[79] *Id.* at 72.
[80] *Id.*
[81] GRCP Report at 30, 43.
[82] *Id.* at 31.

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### 5. Increased Disease Transmission

The survival zones for many organisms in the Northern Hemisphere are moving north with increasing temperatures. Such organisms include dangerous microbes and diseases borne by insects, like mosquitoes. For example, before 1999, no case of West Nile Virus had ever been reported in the U.S.[83] In just five years, the disease had spread across the country, striking hard in areas experiencing drought or above-average temperatures.[84] One thousand Americans have died from the disease thus far.[85] West Nile Virus has been reported in counties surrounding and including Wright Area.[86]

But the problem of climate amplifying disease is not restricted to West Nile Virus. There are a wide variety of diseases that benefit from global warming's increased temperatures and precipitation changes. A partial list includes salmonella, cryptosporidium, giardia, encephalitis, Lyme disease, and hantavirus.[87] Tick-borne diseases can also be expected to increase.[88] Yet-unidentified tropical diseases may also experience a newfound ability to survive in a warming U.S.

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### 6. Increased Allergens

The increase in atmospheric concentrations of $CO_2$ also impacts directly the growth of pollen-producing plants.[89] In a warmer world with increased $CO_2$, ragweed, like many other plants that produce pollen allergens, can be expected to flower earlier and produce more pollen.[90] In fact, because of climate change that has already taken place, ragweed pollen production on a per plant basis might already be at concentrations double what it was a century ago, with close to another doubling to come if carbon dioxide emissions levels are not checked.[91] Increased pollen levels combined with longer allergy seasons could lead to a significant health risk. Especially for the millions of Americans suffering from asthma, allergies can represent a serious health threat, frequently leading to emergency room visits and even hospitalization.[92]

### 7. The DEIS Fails to Consider the Current and Projected Impacts of Climate Change to Ecosystems.

Plants and animals throughout the world have been reacting to ongoing climate change for decades.[93] With changes in temperature and precipitation regimes, and changes in climate-

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[83] *Id.* at 95.
[84] *Id.*
[85] *Id.*
[86] *Id.* at 98.
[87] *Id.* at 95.
[88] GHG TSD at 73.
[89] *Id.*
[90] *Id.* at 74.
[91] GCRP Report at 96.
[92] *Id.*
[93] Rosenzweig, C., et al., *Attributing physical and biological impacts to anthropogenic climate change*, Nature 453:353-357 (May 15, 2009).

driven natural processes, species have been responding in a variety of ways. Survival ranges, ecosystem species mixes, and the timing of seasonal events have all shifted.

Predictions of what is to come for ecosystems are horrifying. In just this century, we could lose one quarter or more of all plant and animal species on the planet from climate change.[94] A species loss of this magnitude is completely outside the entire human experience, not having occurred on Earth for millions and millions of years. Projects like this one must identify and consider current and future climate impacts of endangered, threatened, and sensitive species.

### a. Shrinking ranges

All species have a band of temperature range outside of which they will perish. Likewise, all species have precipitation requirements that, if not met, will kill them. With changing temperature and precipitation patterns, species have been dying off within parts of their natural ranges, areas where they have lived for thousands of years.[95] Because of increased temperatures, it is often the southern most (for Northern Hemisphere species) and lowest elevation areas of natural ranges where species first disappear.

Some species have been able to occupy other areas to partially compensate for their loss of habitat. However, many species do not disburse quickly. For example, birds can often travel many miles to a new habitat area when temperatures in old habitat areas are too high to survive, but snails often cannot do this. New habitat might have a livable climate but present other problems, like absence of food sources, or nest sites, or the presence of predators or competitors. Physical barriers might make retreat impossible. A natural area that is home to threatened species might not be linked to a new home area by a suitable migration corridor. Cities, suburbs, highways, agricultural tracts or even rivers, mountains or deserts could stand in the way of successful migration. Thus, when there is pressure on a whole ecosystem to "move north" to avoid the heat, only some species will complete the transition successfully. And of course for species in the coldest ecosystems, like the polar regions or areas near the tops of mountain ridges, there will soon be nowhere cool enough to go.

Scientists expect climate change to force range shifts in forest types across most of the eastern U.S.[96] It is projected that 75 years from now, few forested areas in the East are expected to support the same tree mixes that they do today. For example, today the climate of New England largely supports forests dominated by maples, beech, and birch. New England's climate in 75 years will be conducive instead to oak and hickory, like the current forests of Tennessee. But whether these tree species can successfully shift hundreds of miles north, to inhabit a whole region in a period of decades, is unlikely. Paleoecological data suggest that tree migration in response to natural climate variability in the distant past happened at a rate of around three miles per decade or possibly much slower.[97]. Estimates to complete the migration process and replace

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[94] GHG TSD at 117.
[95] GCRP Report at 80.
[96] *Id.* at 81.
[97] Soloman, A.M., and A.P. Kirilenko, *Climate Change and Terrestrial Biomass: What if Trees do not migrate?*, Global Ecology and Biogeography Letters 6(2):139-148 (1997).

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fully functioning old-growth forests could range from 400 to almost 2000 years. These data suggest that while forests are already on the move today, they probably cannot retreat fast enough to achieve anything like replacement of the forests that will be lost to a warming climate.

Unfortunately, some species ranges aren't shifting; their ranges are just contracting. Plants and animals in these locations are simply dying, not moving to new locations. Sometimes this occurs very slowly, almost imperceptibly. For example, researchers spent 20 years following the growth of tens of thousands of individual trees on several old-growth forest sites in California's Sierra Mountains.[98] Tree mortality rates during the 20-year period nearly doubled, but new tree recruitment showed no increase. In other words, these old forests are very slowly dying off. The detailed nature of the study allowed researchers to rule out all possible causes of the die-off save one. Soil moisture content had decreased due to subtle temperature increases, and the drier soils killed more trees.[99]

Sometimes though, climate driven die-off happens much quicker and more obviously. Piñon pine, the key overstory species in the widespread piñon-juniper ecosystems found throughout the Interior West, provides a bleak example. Piñon pine is well adapted to arid conditions. Still, drought-driven piñon pine dieback has frequently occurred down through the ages, including during the severe Southwest drought years of the 1950s.

By comparison, the reduction in precipitation that occurred from 2000-2003 was not as extreme, but piñon pine die-off was significantly more severe. Forty to 80 percent of piñon pines of all ages are believed to have perished across more than 3 million acres during that period.[100] Researchers believe that this widespread, rapid die-off was due to slight but significant increases in daily maximum and minimum temperatures. Those temperature increases reduced soil moisture content while simultaneously increasing trees' water needs. The resulting stress made trees vulnerable to insect attack. Just a small shift in climate produced this profound change.

Once overstory trees, like piñon pine, are gone, effects reverberate throughout the affected ecosystem. Ground-level sunlight and microclimates are altered, affecting understory species. Soil composition and erosion patterns can be altered. And in the case of piñon pine, a critical food source for birds, small mammals and local people has all but disappeared from many landscapes. All of this resulted from a slight increase in temperatures.

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[98] Van Mantgem, P.J., and N.L. Stephenson, *Apparent climatically induced increase of tree mortality rates in a temperate forest*, Ecology Letters 10:909-916 (2007).

[99] The die-off during the 20-year period was not dramatic. A casual observer walking through one of these forests would be hard-pressed to pick up on a change of this magnitude. Nonetheless, for forests characterized by trees that are hundreds of years old at maturity, such changes will, after decades, doom the forest to profound transformation. In the absence of widespread, meticulous study, we are undoubtedly not recognizing such changes slowly happening to ecosystems throughout the U.S.

[100] Breshears, D.D., N. S. Cobb, P.M. Rich, K.P. Price, C.D. Allen, R.G. Balice, W.H. Romme, J.H. Kastens, M.L. Floyd, J. Belnap, J.J. Anderson, O.B. Myers, and C.W. Meyer, *Regional vegetation die-off in response to global-change-type drought*, Proceedings of the National Academy of Sciences, 102:15144-15148 (2005).

### b. Altered timing of natural events

Anthropogenic-related climate change has already altered the timing of the first day of spring, which arrives about 10-14 days earlier in the U.S. than it did just 20 years ago.[101] Many species have tracked this change by flowering, hatching, or migrating earlier. Migrating birds in the Northeast are arriving earlier.[102] Butterflies in California are hatching earlier.[103] Marmots in the Colorado Rockies are emerging from hibernation well before previous dates.[104]

But not all species are responding by shifting the timing of important natural events at the same rates. This can mean disaster for some species. For example, if migrating birds arrive before local insects hatch, it can lead to hungry birds that must then leave the area in search of food sources. When the insects do hatch, there are fewer birds present to eat them, meaning more insects survive to attack trees and other plants. Climate-driven changes cascade through ecosystems.

As another example, Rocky Mountain alpine and subalpine plants are flowering earlier than in the past, driven by earlier snowmelt. While the snows are melting earlier, the timing of late frosts has not shifted in equal measure.[105] Ironically, perennial plants that exist for more than half the year dormant under many feet of snow are now blooming early and then unexpectedly being destroyed by frost. Delphinium and helianthella species, glacier lilies and even conifer trees are being affected by this break in nature's synchronicity. Numerous additional examples, including plants and animals from around the country can be cited.[106]



### c. Bigger and more frequent wildfires

Earlier snowmelt and longer summers are drying wildland fuels, and the lowered moisture content is leading to easier wildfire ignitions and faster fire spread.[107] Longer summers, drier fuels, and drier soils have also led to a longer western fire season, now running about two and one-half months longer than it did just 30 years ago. Big fires are also burning far longer – five times longer in the last three decades. Almost seven times as much area burned in the western United States from 1987 to 2003, as compared to the 16 previous years.[108] While wildfire is a natural process in many forested ecosystems, the climate-driven increase in fire behavior is not.

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[101] GCRP Report at 80.

[102] Butler, C., *The disproportionate effect of climate change on the arrival dates of short- distance migrant birds*, Ibis, 45:484-495 (2003).

[103] Forister, M.L. and A.M. Shapiro, *Climatic trends and advancing spring flight of butterflies in lowland California*, Global Change Biology 9:1130-1135 (2003).

[104] Inouye, D.W., B. Barr, K.B. Armitage, and B.D. Inouye, *Climate change is affecting altitudinal migrants and hibernating species*, Proceedings of the National Academy of Sciences 97:1630-1633 (2000).

[105] Inouye, D.W. 2008, *Effects of climate change on phenology, frost damage, and floral abundance of montane wildflowers*, Ecology 89(2):353-362 (2008).

[106] *See, e.g.*, Parmesan, C. and G. Yohe, *A globally coherent fingerprint of climate change impacts across natural system*, Nature 421:37 (2003).

[107] Running, S.W., *Is global warming causing more larger wildfires?*, Science 313:927-928 (2006).

[108] Westerling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam, *Warming and earlier spring increase western U.S. forest wildfire activity*, Science 313:940-943 (2006).

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Also experiencing a huge increase in fire is the boreal forest of Alaska and Canada. More than twice as much boreal forest acreage burned in the 1980s and 1990s as did during the previous two decades.[109] Again, a rise in temperature seems to be driving the increase.

On top of increased forest fire activity, it appears that the new regime of increased fire behavior, in combination with the current public lands management response of salvage logging and plantation establishment after fire, is self-reinforcing. In a large area in Oregon where forest fires had burned twice in 20 years, the portions that were salvage logged and planted after the first fire experienced higher fire severity and higher tree mortality during the second fire, when compared to immediately adjacent burned areas that were allowed after the first fire, to naturally regenerate.[110] When human-generated stressors on ecosystems become self-reinforcing like this, ecosystem types can shift completely. Usually such shifts are to less-favored types, for example, from forests to brush fields.

Grasslands and arid areas present another example of possible ecosystem conversion. Due to nitrogen deposition and human disturbance, primarily from cattle ranching, non-native grasses are replacing native species. In many instances, non-native grasses provide a larger and more continuous fuel load, potentially leading to bigger and more comprehensive grassland and desert fires. Combined with climate change, there is a concern that in some areas more frequent and more intense fires may be allowing fire-tolerant non-native species to completely replace original prairie and desert ecosystems.[111]

Prehistoric evidence shows warmer periods associated with more fire activity.[112] Longer growing seasons and drier soils will very likely lead to more frequent and more intense wildfires.[113] Low humidity days correctly predict increased fire activity and climate models predict significantly more low humidity summer days in the West during the next two decades.[114] The newest predictions on wildfire expect a climate-driven average increase in acres burned in the West to be about 75 percent higher than today's already-elevated levels.[115] Many areas will see the number of predicted acres burned more than double by 2050. Predictions in

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[109] Duffy, P.A., J.E. Walsh, J.M. Graham, D.H. Mann, and T.S. Rupp, *Impacts of large-scale atmospheric-ocean variability on Alaskan fire season severity*, Ecological Applications 15:1317-1330 (2005).

[110] Thompson, J.R., T.A. Spies, and L.M. Ganio, *Reburn severity in managed and unmanaged vegetation in a large wildfire*, Proceedings of the National Academy of the Sciences 104(25):10743-10748 (2007).

[111] Ryan, M.G., S.R. Archer, R.A. Birdsey, C.N. Dahm, L.S. Heath, J.A. Hicke, D.Y. Hollinger, T.E. Huxman, G.S. Okin, R. Oren, J.T. Randerson, and W.H. Schlesinger, (2008) Land resources. In: *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity. Synthesis and Assessment Product 4.3 by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research, Washington, DC.*

[112] *Id.*

[113] Intergovernmental Panel on Climate Change (IPCC) Climate Change 2007: Impacts, Adaptation and Vulnerability, *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Parry, M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA (2007).

[114] Flannigan, M.D., B.J. Stocks, and B.M. Wotton, *Climate change and forest fires*, Science of the Total Environment 262:221-229 (2000).

[115] Spracklen, D. V., L. J. Mickley, J. A. Logan, R. C. Hudman, R. Yevich, M. D. Flannigan, and A. L. Westerling, *Impacts of climate change from 2000 to 2050 on wildfire activity and carbonaceous aerosol concentrations in the western United States. J. Geophys. Res.* (June 18, 2009).

out years find significant increased fire activity in the Northeast, and, especially, in the Southeast, possibly completely converting much closed-canopy Southeast forest to open savannah.[116]

### d. Rising insect epidemics

Climate change can amplify the threat of insects in a number of ways. As with the dispersal of other species, warming temperatures mean insects can travel northward and upslope to areas where they were not able to survive previously.[117] In many areas, cold winters used to kill off dormant insects or insect eggs, providing natural northern and upslope boundaries to insect spread.[118] Warmer winters drop those natural barriers and allow such spread. In addition, longer summers mean longer periods of attack for many species, like the mountain pine beetle.[119]

Mountain pine beetles have damaged about 1.5 million acres in Colorado, affecting over half of Colorado's forested acres.[120] (In British Columbia, the figure is an absolutely devastating 33 million acres.[121]) In Yellowstone National Park, 170,000 acres of whitebark pine have been damaged.[122] Whitebark pine nuts provide an important source of late-summer, pre-hibernation food for Yellowstone grizzly bears, which may now be negatively affected by the insect outbreak. Spruce beetles in southern Alaska and Canada have damaged 3.7 million acres of forest.[123] Because of warming temperatures, some insects are able now to go through two life cycles in one year.[124]

Climate change can also stress tree species in ways that make them more susceptible to insect or disease attack. The most obvious example would be trees stressed by reduced soil moisture. Stressed trees may not be able to produce as many natural chemicals used to fight off attack.[125] And there are other unique ways in which insects can take advantage of a warming world. Insect

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[116] Bachelet, D., R.P. Neilson, J.M. Lenihan, and R.J. Drapek, *Climate change effects on vegetation distribution and carbon budget in the United States*, Ecosystems 4:164-185 (2001).

[117] Blacklund, P., A. Janetos, and D. Schimel, *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity. Synthesis and Assessment Product 4.3* by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research, Washington, DC (2008).

[118] Harvell, C.D., C.E. Mitchell, J.R. Ward, S. Alitzer, A.P. Dobson, R.S. Ostfeld, and M.D. Samuel, *Climate Warming and Disease Risks for Terrestrial and Marine Biota*, Science 296(5576):2158-2162 (2002).

[119] IPCC (2007).

[120] GCRP Report at 82.

[121] *Id.*

[122] Gibson, K.E., Mountain Pine Beetle Conditions in Whitebark Pine Stands in the Greater Yellowstone Ecosystem, R1Pub06-03, Forest Health Protection Report, USDA Forest Service, Northern Region, Missoula, MT, USA (2006).

[123] Berg, E.E., J.D. Henry, C.L. Fastie, A.D. De Volder, and S.M. Matsuoka, *Spruce beetle outbreaks on the Kenai Peninsula, Alaska, and Kluane National Park and Reserve, Yukon Territory: Relationship to summer temperatures and regional differences in disturbance regimes*, Forest Ecology and Management 227:219-232 (2006).

[124] Volney, W.J.A. and R.A. Fleming, *Climate change and impacts of boreal forest insects*, Agriculture, Ecosystems & Environment 82:283-294 (2000). Recently in Alaska, warm summers have grown so long that spruce budworm was able to complete both stages of its lifecycle in a single year, thereby greatly increasing its threat to Alaskan trees.

[125] Logan, J.A., J. Régnière, and J.A. Powell, *Assessing the impacts of global warming on forest pest dynamics*, Frontiers in Ecology and Environment 1(3):130-137 (2003).

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reproduction, population growth and even biting behavior can all increase with increased temperatures.[126]

e. Hotter and more acidic oceans with rising sea levels 18

One of the most dramatic impacts to ocean ecosystems is the bleaching of coral that results from increased water temperatures. Bleaching is the last step in the destruction of coral ecosystems before the final death of the coral itself. In 1998, which at the time was the warmest year on record, bleaching occurred in every ocean, ultimately resulting in the death of 10 to 16 percent of the world's living coral.[127] In 2005, which eclipsed 1998 as the warmest year on record, a major bleaching event swept through the Caribbean, bleaching more than 90 percent of live coral in some areas and resulting in the ultimate death of about 20 percent of living coral region-wide.[128] In the U.S. Virgin Islands National Park, one half of corals have already died from overheated waters.[129] It may not take many more episodes like the 2005 bleaching event before living coral reefs in the Caribbean disappear entirely. The world's ocean temperatures in June 2009 set a monthly record for warmth, easily outpacing the previous 2005 mark.[130]

Corals and other sea life are also affected directly by the dissolution of increasing concentrations of carbon dioxide in seawater. As atmospheric carbon dioxide is dissolved in surface seawater, seawater becomes more acidic, shifting the balance away from carbonate ions and toward bicarbonate. This shift decreases the ability of corals and other sea life to calcify because corals use carbonate, not bicarbonate, to build their skeletons. This process could also affect phytoplankton, the primary building blocks of ocean ecosystems. Once ocean acidification occurs, it is essentially irreversible for centuries.[131]

Sea level rise might also directly affect corals, and it is certain to destroy many low-lying tidal ecosystems. In this century, rising seas could cause our nation to lose two-thirds of its remaining coastal wetlands.[132] Together, coral reefs and coastal wetlands represent some of our biologically richest saltwater ecosystems. They are the nursing grounds for many fish and other species and provide important ecosystem functions like filtering water and supporting key links in food webs. 6

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[126] Harvell, C.D., C.E. Mitchell, J.R. Ward, S. Alitzer, A.P. Dobson, R.S. Ostfeld, and M.D. Samuel; *Climate Warming and Disease Risks for Terrestrial and Marine Biota*, Science 296(5576):2158-2162 (2002).

[127] Hoegh-Guldberg, O. 2005. Marine Ecosystems and Climate Change. Climate Change & Biodiversity, [Lovejoy, T.E., L. Hannah (eds.)].

[128] Hansen, J., M. Sato, R. Ruedy, K. Lo, D. W. Lea, M. Medina-Elizade. 2006. *Global temperature change*, Proceedings of the National Academy of Sciences (PNAS) Published online September 25, 2006, doi:10.1073/pnas.0606291103; Federal Response to the 2005 Caribbean Bleaching event, available at http://coralreefwatch.noaa.gov/caribbean2005/docs/2005_bleaching_federal_response.pdf (last accessed Jan. 29, 2008).

[129] GCRP report at 84.

[130] National Climatic Data Center, *Climate of 2009 – June in Historical Perspective* (July 16, 2009) available at http://www.ncdc.noaa.gov/oa/climate/research/2009/jun/global.html.

[131] *Id.* at 17.

[132] *Id.* at 84.

### f. Polar ecosystem impacts

The polar regions are melting quickly, both sea ice and permafrost, threatening whole ecosystem types with extinction. Arctic sea ice extent during the summer months has been dropping more than 6 percent per decade.[133] Retreats since 2007 have been especially dramatic. This is a threat to the foundational building block of Arctic ecosystems: sea ice algae.[134] And could mean the loss of species all the way up the food chain, including the loss of the top predator, polar bears, from all of Alaska, during this century.[135] For this reason, the polar bear has now been formally listed under the Endangered Species Act as a threatened species.

The diverse tundra ecosystem is also under threat. With increased warming and the melting of the permafrost, tundra is being replaced by encroaching lower latitude forests. And as mentioned previously, as ecosystems move north, those at the top of the world, like tundra, have nowhere else to go.

## 8. Rising costs

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The full economic impact of climate change cannot be accurately estimated. In some cases, dollar amounts can be given for known impacts. In other cases, impacts to economic activity can only be qualitatively described.

The 1998 heat wave killed 5,000 to 10,000 people in the U.S.. That one heat wave is estimated to have cost the U.S. $70 billion in lost lives, health care costs, and lost productivity.[136] Air quality problems provide another example; California alone spends over a billion dollars a year on air pollution-related health problems.[137] That number is expected to increase with future warming, and does not even account for degradations in air quality due to increased forest fires. For example, Red Alert days – days when experts say the air is unhealthy for everyone to breathe – are expected to increase across the U.S. by 68 percent due to global warming.[138] When multiplied across 50 states and added up across decades, climate change driven air quality problems represent a significant toll on the economy.

In 2005, people suffering from airborne allergies in the U.S. spent $11.2 billion to address the problem, not counting money spent on over-the-counter medications.[139] This figure also does not count days missed at work or other losses of productivity. The figure was almost double what was spent in 2000. If ragweed and other allergic pollen producers increase pollen production even further, society could face losses of additional billions. These figures just hint

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[133] For historical and up-to-date sea ice reports, see National Snow and Ice Data Center, *Arctic Sea Ice News and Analysis*, available at http://nsidc.org/arcticseaicenews/.
[134] GCRP Report at 85.
[135] *Id.*
[136] GCRP Report at 102.
[137] *Id.* at 93.
[138] *Id.* at 94.
[139] Soni, A., *Allergic Rhinitis: Trends in Use and Expenditures, 2000 and 2005*, Agency for Healthcare Research and Quality (May 2008).

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at the magnitude of the public health costs the U.S. will face in coming years due to climate change.[140]

Hurricane Katrina alone cost the U.S. economy some $134 billion dollars.[141] Current scientific consensus predicts that tropical cyclones of the future will become even more intense as sea surface temperatures continue to rise.[142]

In 2008, the U.S. government spent about $1.5 billion in forest fire suppression efforts.[143] Since 2000, the government has spent an average of $1 billion per year on suppression efforts.[144] As explained above, forest fires are expected to increase throughout the West with an average of 75 percent more acres burned per year. But fire suppression costs represent just a fraction of the costs to society of wildfires. When damage to resources, degradation of air quality, closed roads, lost tourism and other factors are included, estimates of the true costs of wildfires can far more than double the costs of suppression efforts.[145]

Unlike wildfire and hurricanes, drought is a disaster in slow motion. Increased drought is predicted in subtropical latitudes, the lower tier of states in the U.S. Severe, multiple-year droughts can devastate regional economies. The most recent example in the U.S. is the ongoing drought in South Texas. During the last nine months alone, crop and live stock losses in the region total $3.6 billion.[146] That drought is expected to persist and possibly intensify in the next several months.[147] Economic losses could climb much higher. Southern states can expect so-called 50 and 100-year droughts to occur with increasing frequency.

The biggest climate disaster of all, sea level rise, looms. While the degree of sea level rise and how fast it will strike remain open questions, this much is clear: seas are rising, and rising quicker than at any time in history.[148] The amount of sea level rise certain to occur will be enough, combined with storm surges to cause serious, and very costly problems for many coastal cities.[149] Communities in the Southeast and in Alaska are especially vulnerable in the short term, but it is important to note that 53 percent of the U.S. population lives in a coastal county, so the extent of impacts will eventually be quite widespread.[150] The area of the country with the

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[140] For example, estimates are not available for the wide range of infectious diseases that could increase from global warming.

[141] *Id.* at 68.

[142] GHG TSD at ES-4.

[143] Western Forestry Leadership Coalition, *The True Cost of Wildfire in the Western U.S.* (Apr. 13, 2009), available at http://www.wflcweb.org/infomaterials/reports.php ("True Cost").

[144] Nevada Division of Forestry, *The True Costs of Wildfires Revealed* (May 12, 2009), available at http://forestry.nv.gov/?p=2155.

[145] *Id.* at 16.

[146] Benning, T., *Texas Scorched By Worst Drought in 50 Years*, Wall Street Journal (July 28, 2009) available at http://online.wsj.com/article/SB124872939604384837.html.

[147] Climate Prediction Center, *U.S. Seasonal Drought Outlook* (July 16, 2009) available at http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html.

[148] GHG TSD at 30.

[149] GCRP Report at 10.

[150] GHG TSD at 100.

greatest concentration of people living near the coast, the Northeast, is also expected to bear the brunt of the greatest level of rise, perhaps a foot and one-half greater than the world average.[151]

### 9. Earlier snow melt and threatened water supplies

Drinking water quality and quantity can be harmed by climate change in at least three principle ways. As described above, water quality can be harmed by too much water, when flooding overwhelms treatment systems and sewage flows into drinking water sources. Drought can lead to water quality and quantity problems as has happened recently in the Southeast and in the many Western states that rely upon the Colorado River.[152] A third problem can occur when precipitation quantities remain similar to those in the past, but early melting snow in the spring leaves late season water shortages. This problem is exacerbated when winter precipitation falls more often as rain instead of snow.

Significantly lower levels of snow are accumulating already in Washington and Oregon.[153] Throughout much of this region, mountain snow accumulation at the end of winter has fallen about 25 percent in the last half century.[154] The decrease in snowpack is also a major concern.[155] This phenomenon, combined with the problem of greater evaporation due to higher temperatures, has caused end of summer drought to increase during the last 50 years in most of the Northwest and much of the rest of the Mountain West.[156] The decline in snowpack is expected to worsen from global warming.[157]

When water supplies dwindle, users compete for constrained supplies. Some users can be driven out of business by reduced water supply or by increased water costs in a highly constrained market. Development is curtailed. Agricultural and industrial users can be shut down. In an attempt to replace the inexpensive lost storage of mountain snowpack, expensive storage and conservation measures must be employed.

The value of the water supply in the nation as a whole probably runs to at least trillions of dollars.[158] A substantial and potentially permanent loss of supply, even to just a single region of the country, could cost society hundreds of billions of dollars.

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[151] Hu, A., Meehl, G.A., Han, W., Yin, J., *Transient Response of the MOC and Climate to the Potential Melting of the Greenland Ice Sheet in the 21st Century*, Geophysical Research Letters, 36:L10707 (May 29, 2009).
[152] *See* GCRP Report at 51.
[153] *Id.* at 42.
[154] *Id.* at 135.
[155] GHG TSD at 95.
[156] GCRP Report at 43.
[157] GHG TSD at 95.
[158] *See* Army Corps of Engineers Institute for Water Resources, *Water Supply: Value to the Nation*, available at http://74.125.93.132/search?q=cache:Jk8GNY-Fp1QJ:www.spn.usace.army.mil/value_to_the_nation/WaterSupply.pdf+value+of+water+supply&cd=1&hl=en&ct=clnk&gl=us&client=firefox-a.

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10. Unstable farming conditions

Agricultural operations benefit from stable and predictable weather. While weather has always been uncertain to a degree, unprecedented changes in climate could lead to decreases in productivity and severe financial hardship for farmers. Increased drought means an increased need for irrigation water. Global warming means longer warm seasons and increased evaporation. In total, these effects by 2030 are expected to increase irrigation needs nationwide by a staggering 35 percent.[159]

Like drought, climate-driven flooding can also mean billion dollar losses for farmers. In 2008, insurance companies paid farmers a record $8.6 billion for crop losses, primarily due to Midwest flooding.[160] The economic loss to farmers and farming communities from last year's flooding was even higher.

Less drastic climate-driven factors are also of concern on farms. Warmer winters allow insects, parasites, and other pathogens to successfully survive the winter season, leading to increased crop losses in the following years.[161] Heavy spring rains, already being experienced, can push back planting dates and affect productivity.[162]

In addition, the increase in $CO_2$ concentrations themselves can directly cause problems. Different types of plants respond differently to increased $CO_2$. Unfortunately, many aggressive weeds benefit greatly from increased concentrations, whereas the benefits to cash crops that must compete with these pumped up weeds are generally smaller.[163] Compounding that problem, the most commonly used herbicide in the nation loses effectiveness when weeds are grown amidst higher $CO_2$ concentrations.[164]

Some researchers, looking across the next several decades, have explored the ways grains and other major crops respond to increased temperature and $CO_2$ levels and found that, when a wide range of crops are considered, initially the two factors tend to neutralize one another.[165] But if greenhouse gas concentrations continue to rise, impacts on farmers from these two factors will soon turn negative.[166] Apart from grains, horticultural crops, like fruits and vegetables, appear to be even more sensitive to climate change.[167]

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[159] GHG TSD at 85.
[160] Insurance Journal, *2008 Losses Lead to Record Insurance Payments for Midwest Farmers* (July 22, 2009) available at http://www.insurancejournal.com/news/midwest/2009/07/22/102419.htm.
[161] GHG TSD at 82.
[162] GCRP Report at 50.
[163] GHG TSD at 82.
[164] *Id.*
[165] *Id.* at 84.
[166] *Id.*
[167] *Id.* at 82.

## 11. Inequity of impacts

Climate impacts including economic impacts will not be distributed evenly throughout the world. People living in arid and semi-arid regions or low-lying areas, and people already living on the edge of economic survival, will likely be among those hardest hit. In a recent report issued by Former U.N. Secretary-General Kofi Annan and the Global Humanitarian Forum, climate change is estimated to cost the world $125 billion per year currently, and to rise to $340 billion by 2030.[168] A global loss of trillions of dollars per decade is difficult to imagine. The economic dislocation, death, and mass migration are projected to lead to increased global insecurity and thereby create a further threat to U.S. economic interests.[169]

Climate impacts will not be spread equally throughout the U.S. either. Unfortunately, analysts predict that the most vulnerable in our society will be those hardest hit by global warming: kids, seniors, the poor, and future generations.[170] Native Americans, especially those living in Alaska, are already bearing the greatest impacts from climate change, including the need to relocate entire communities from rising seas and eroding shores.[171]

Still greater impacts are predicted for other species. In an already degraded world, climate change may be the final blow for perhaps a million different kinds of plants and animals. And extinction is not just death; it is the end of birth. Once gone, these species will not come back. Ever.

It is a sad irony that those who have done the least to pollute the atmosphere will often bear the greatest burden of dealing with a warming world. Such knowledge places an extra burden of responsibility on those who have the power to make a difference.

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## 12. The social cost of carbon

Economists have attempted to estimate how much total economic damage is done through the emissions of a set amount of carbon, usually a metric ton. This estimated value has become known as the social cost of carbon. These measurements can be used to estimate just how serious climate change is in economic terms, and to compare the costs of policies to address climate change with the often forgotten costs of inaction.

Estimates of the social cost of carbon are admittedly incomplete. Costs from certain sectors, or costs from more dire predictions of climate change are often not even evaluated. Estimates of the social cost of carbon are sensitive to the discount rate employed. Depending on how much society values the economic impacts that will be felt by future generations, the estimated social

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[168] Global Humanitarian Forum, *The Anatomy of a Silent Crisis* (May 29, 2009) at 20, available at http://www.ghfgeneva.org/OurWork/RaisingAwareness/HumanImpactReport/tabid/180/Default.aspx.

[169] Broder, J., *Climate Change Seen as Threat to U.S. Security*, New York Times (August 8, 2009) available at http://www.nytimes.com/2009/08/09/science/earth/09climate.html.

[170] GHG TSD at 101.

[171] *Id.*

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cost of carbon can rise or fall by an order of magnitude or more. But despite such variability and uncertainty, a short review of various estimates of the social cost of carbon can be instructive.

The most widely known estimate of the social cost of carbon was reported in "The Stern Review: The Economics of Climate Change."[172] This analysis found that continuing on a business-as-usual path would lead to a social cost of carbon of $85 per ton of $CO_2$.[173] The authors of this estimate admit to omitting several factors that could raise costs significantly. For example, non-market factors are not included, positive feedback loops that could amplify warming are ignored, and equity issues are not treated.[174] If such factors were included, the social cost of carbon might increase by a factor of four, to well over $300 per ton.[175]

While The Stern Review might be the most well-known estimate of the social cost of carbon, hundreds of similar studies have been published.[176] As mentioned above, results vary greatly between studies based on factors ignored, and even within studies based on assumptions made. Researchers have performed statistical analysis on the results of more than 200 such studies and found a median price for the social cost of carbon varying from $15 to $74 per ton of $CO_2$.[177]

There are several important conclusions that can be drawn from looking at numerous studies with such a wide variety of assumptions. Perhaps the most important conclusion is that even with the most conservative set of assumptions, the social cost of carbon emissions is not zero.[178] Or in other words, looking at the whole body of climate change economic analysis, it is clear that there are economic benefits to society as a whole in placing a significant charge on the most carbon-intensive practices in the economy, for example, the burning of coal.

How high such a charge should be is in dispute. But there are close to 50 published studies that find that the social cost of carbon is above $100 per ton of carbon dioxide and could range to well over $1000 per ton.[179] It is worth noting that none of these economic studies account for the latest climate science that suggests that both emissions and impact levels are exceeding recent predictions on many fronts.[180] Further, even studies with results suggesting a high social cost of carbon do not include analysis of the most dire predictions about the possible impacts of global warming, because to do so would find impacts beyond any possible dollar-per-ton figure.

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[172] Stern, N., *The Stern Review: The Economics of Climate Change*, HM Treasury, London (2006), available at http://www.hm-treasury.gov.uk/sternreview_index.htm.
[173] *Id.* at xvi.
[174] *Id.* at x.
[175] *Id.*
[176] Tol, Richard S.J., *The Social Cost of Carbon: Trends, Outliers and Catastrophes*, Economics: The Open-Access, Open-Assessment E-Journal, Vol. 2, 2008-25 available at http://www.economics-ejournal.org/economics/journalarticles/2008-25.
[177] *Id.* at 6. Note, because some studies find that the social cost of carbon is very high, mean values for the distribution of social cost of carbon values range much higher than median values, from $127 to $188 per ton.
[178] *Id.* at 9.
[179] *See id.* at 11-16.
[180] *See, e.g.*, Copenhagen Report.

## 13. Runaway climate change

In the recent report of the U.S. Global Change Research Program, global temperatures in the year 2100 are predicted to be 2 to 11.5°F higher than they are today.[181] Temperatures in the U.S. will rise still higher than global averages.[182] As catastrophic as such increase in one century would be, temperatures could actually change much more quickly than that.

Ice core data from Greenland reveal that the end of the last ice age was triggered by a rapid and intense warming. Air circulation patterns over the planet shifted within a year or two. The warming that followed raised planetary temperatures 22°F in just 50 years.[183] That amounts to a total warming almost double the IPCC's and the GCRP's worst-case predictions, occurring in about half the time. Runaway climate change can happen, and it did, as recently as just before the dawn of agriculture and civilization, when humans still lived as tribal hunters and gatherers.

The climate system includes numerous positive, amplifying feedback loops and no one can say for certain what their full impact on climate change will be. For example, as reflective snow and ice cover melt, darker water and land revealed below absorb more heat from the sun, thereby leading to greater melting of snow and ice. As permafrost areas melt, $CO_2$ and methane previously trapped in soils leak into the atmosphere leading to further warming. Higher temperatures dry out forest soils, which increases forest fires, leading to greater emissions. Acidic oceans may produce less carbon trapping plankton. Desertification may cause soils to release stored carbon and plants to reduce their sequestration.



Few climate modelers have attempted to build such feedback loops into their models. Therefore, it is possible that these amplifying effects may prove all climate model estimates to be too low. Like at the end of the last ice age, climate change could happen very quickly and to a far greater degree than generally predicted. In the present case, though, the warming would not come during an ice age, but on top of a world climate already abnormally warmed – that is, at a time when the Earth is as hot as it has been in thousands of years.

The destruction from business-as-usual climate change that is outlined above could be catastrophic. But the effect of runaway climate change would be an existential threat to human civilization itself. Clearly it is the first responsibility of political leaders in this age to do everything in their power to avoid such an outcome. Best estimates of top scientists should figure prominently when setting policy that affects climate. But when judgment is called for, it would be foolish to ignore the distinct possibility that the climate problem might get very much worse, very quickly. Erring on the side of caution when setting climate and energy policy is clearly warranted.

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[181] GCRP Report at 9.

[182] *Id.*

[183] Steffensen, J.P., K.K. Andersen, M. Bigler, H. B. Clausen, D. Dahl-Jensen, H. Fischer, K. Goto-Azuma, M. Hansson, S. J. Johnsen, J. Jouzel, V. Masson-Delmotte, T. Popp, S. O. Rasmussen, R. Rothlisberger, U. Ruth, B. Stauffer, M.-L. Siggaard-Andersen, A. E. Sveinbjörnsdóttir, A. Svensson, J. W. C. White, *High-Resolution Greenland Ice Core Data Show Abrupt Climate Change Happens in Few Years*, Science DOI: 10.1126/science.1157707 (2008).

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## D. The DEIS Fails to Disclose or Consider Coal Mining's Non-Climate Impacts.

The impacts of global climate change and coal's central role in producing those impacts create an overwhelming mandate to rapidly phase out the use of coal in America. But even before the impacts of climate change were as well understood, the case for phasing out the use of coal was strong. Coal, when analyzed comprehensively, has been an unjustifiable drain on society for many decades. These impacts are omitted from the DEIS but present further reasons that BLM should select the No Action alternative.

### 1. Human health impacts

Coal mining and coal burning are associated with a wide variety of air pollution problems that degrade public health. For example, as the DEIS notes, coal is responsible for the release of large amounts of volatile organic compounds ("VOC") and nitrogen oxides ("NOx"). These compounds are precursors to ozone formation. As discussed above, ozone health problems are expected to worsen if global warming is left unchecked. But even without global warming, people are dying from coal-generated ozone today. Long-term exposure to ozone in regions with high concentrations increases risk of death from respiratory disease by 25 to 30 percent compared to people in low ozone areas of the U.S.[184] And while previously considered an urban problem, rural areas of the West are now exceeding federal ozone pollution limits, primarily because of fossil fuel development.[185] Impacts are being seen in States where coal is surface mined on public lands, like Wyoming, New Mexico, and Colorado.

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In the West, ozone is no longer just a summertime problem. According to a scientist from the National Oceanic and Atmospheric Administration, methane releases and machinery at Western coal mines might be responsible for degrading otherwise clean, winter air with unhealthy ozone levels.[186] Contrary to the letter and intent of NEPA, there appears to be a complete lack of analysis of coal-bed natural gas releases and their cumulative effects on ozone pollution.

We know there is a great deal of natural gas in the coal. The best estimate given in the DEIS seems to be 6.8 standard cubic feet of natural gas per ton of coal.[187] If 2.5 billion tons of coal were to release its methane content, about 238,000 tons of methane would be released.[188] Even more gas would be released when nearby areas are dewatered to allow coal mining, and gas is subsequently released.

Particulate matter is another coal-related air pollution problem. Fine particles lofted into the air, known as $PM_{2.5}$ or $PM_{10}$, can lead to a variety of respiratory ailments, heart attacks and even

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[184] Jerrett, M., Burnett, R. T., Pope, C. A., Ito, K., Thurston, G., Krewski, D., Shi, Y., Calle, E., Thun, M., *Long-Term Ozone Exposure and Mortality*. New England Journal of Medicine (March 12, 2009) 360: 1085-1095.

[185] Jaffe, M., *From Calif. To Denver: Ozone woes become regional*, Denver Post (November 2, 2008) available at http://www.denverpost.com/newsheadlines/ci_10878107.

[186] Jaffe, M., *The cold truth about ozone*, Denver Post (March 4, 2009) available at http://www.denverpost.com/breakingnews/ci_11829606.

[187] *See* DEIS at 3-29.

[188] DEIS Abstract.

premature death.[189] Thirty percent of American live in counties where particulate concentrations are too high for healthy air.[190] Approximately 24,000 Americans suffer premature death from coal-fired power plant particulate emissions, their lives ending an average of 14 years early.[191] Coal operations emit particulate matter during mining, from machinery, during transport by train, and when burning. Concentrations of particulate matter in many public lands coal mining areas have increased over the last several years.[192]

This project is required to be in conformity with federal and state environmental laws, including air pollution laws. The annual Wyoming Ambient Air Quality Standard ("WAAQS") for $PM_{10}$ is 50 $\mu g/m^3$.[193] The modeled concentration of $PM_{10}$ for the Black Thunder Mine in 2017 is 49.96 $\mu g/m^3$.[194] The modeled concentration of $PM_{10}$ for the Jacobs Ranch Mine in 2015 is 49.61 $\mu g/m^3$.[195] These numbers are incredibly close to the legal limit for $PM_{10}$, yet just miss being a violation. Given that much of the input data to these models was provided by the mining companies, BLM should further investigate whether approval of this project will, in fact, lead to violations of the Wyoming air standard. 3

Indeed, it turns out that these mines are already violating that standard. In an effort to dismiss concerns about those violations, while not doing anything to actually make air around the mines safe to breathe, the State of Wyoming and the mines are working on a plan that would blame mine dust on the wind, not the mines. The "Natural Events Action Plan" has not been approved by EPA.[196] The mines are in violation of particulate standards. Approval of this project would lead to a significant deterioration of air quality already out of compliance. This is made readily apparent by Table ES-13.[197]

Perhaps the most destructive air pollutant from coal though is mercury. Mercury has two qualities that make it such a vicious pollutant; it is persistent and it accumulates in the food chain.[198] Mercury's most devastating effect is to kill brain cells in infants and in children that are still developing in the womb.[199] An estimated 300,000 to 630,000 babies are born every year in the U.S. with enough mercury in their bloodstream to be considered at risk.[200] The largest

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[189] EPA, *Particle Pollution and Your Health* (Sep. 2003) EPA-425 F-03-001 available at http://www.airnow.gov/index.cfm?action=particle.cover.

[190] *State of the Air: 2009.*

[191] Abt Associates, Inc., *Power Plant Emissions: Particulate Matter-Related Health Damages and the Benefits of Alternative Emissions Reduction Scenarios*, (June 2004) at 6-1, 5-6, available at http://www.catf.us/publications/ ("*Power Plant Emissions*").

[192] *See* EPA, *National Air Quality – Status and Trends through 2007: Particle Pollution* (2008) at 24, available at http://www.epa.gov/air/airtrends/2008/.

[193] DEIS at 3-44.

[194] *Id.* at 3-47.

[195] *Id.* at 3-50.

[196] *Id.* at 3-63.

[197] *Id.* at ES-58.

[198] EPA, *Clean Air Mercury Rule: Basic Information* (Mar. 15, 2005) ("*Clean Air Mercury Rule*") available at http://www.epa.gov/mercuryrule/basic.htm.

[199] *Id.*

[200] Mahaffey, K., *Update on Recent Epidemiologic Mercury Studies*, in Proceedings in the 2004 National Forum on Contaminants in Fish (January 2004) available at http://nepis.epa.gov/Exe/ZyNET.exe/901T0200.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000%20Thru

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sources of mercury in the U.S. are coal-fired power plants.[201] The EPA recently acknowledged that current standards for mercury pollution from coal-fired power plants are not protective of health and additional steps to curtail such pollution from coal must be mandated.[202]

The U.S. Geological Service has just published a comprehensive review of mercury deposition in the U.S.[203] Fish in 291 streams were sampled for mercury across the country and more than one-quarter were found to have mercury levels making them unsafe to eat. Fish-eating mammals will get sick eating two-thirds of the fish sampled.

In response to this health tragedy, and in the name of a cumulative impacts analysis, BLM seeks to excuse PRB coal mining.[204] To say that mercury is emitted by volcanoes or China is not a substitute for analyzing the cumulative impacts of mercury that will be emitted by the proposed project and describing the impacts those emissions will have on children and wildlife. 20

Coal makes people ill throughout the country, but one target group bears the greatest brunt of coal's deadly effects – coal miners. Mine workers experience a wide variety of work-related health issues, including mine accidents and widespread hearing loss, but the most deadly health issue remains black lung disease. While sometimes thought of as a thing of the past, black lung is a continuing health problem, with today's miners still developing the disease, and over 10,000 miners dying from black lung disease in the last decade alone.[205] Both underground and surface mine operators are required to pay into a Black Lung Disability Trust Fund.[206] Through the end of the 2004 fiscal year, that fund has paid out over $41 billion to sick coal miners and their surviving family members to address this tragedy.[207] Unfortunately, those payments by no means cover the full costs to society of this crippling effect of coal.

While not a health concern *per se*, visibility is an air quality issue that was also incompletely analyzed in the DEIS. This is especially true with regard to its environmental justice impacts. 3

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%202005|Hardcopy%20Publications&Docs=&Query=asbestos%20risk%20&Time=&EndTime=&SearchMethod=2&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\ZYFILES\INDEX%20DATA\00THRU05\TXT\00000011\901T0200.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=10&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page.

[201] *Clean Air Mercury Rule*; DEIS at 4-126.

[202] *Id.*

[203] U.S. Geological Service, *Mercury in Fish, Bed Sediment, and Water from Streams across the United States 1998-2005* (Aug. 2009) Scientific Investigative Report 2009-5109 available at http://pubs.usgs.gov/sir/2009/5109/.

[204] *See* DEIS § 4.2.14.2.

[205] Attfield, M., Wolfe, A., Petsonk, E., *Faces of Black Lung*, National Institute of Occupational Safety and Health, Centers for Disease Control (August 18, 2008) available at http://www.cdc.gov/niosh/blog/nsb081808_blacklung.html.

[206] U.S. Department of Labor, *Employment Law Guide: Black Lung Compensation* available at http://www.dol.gov/compliance/guide/blklung.htm.

[207] Government Accountability Office, *Federal Compensation Programs: Perspectives on Four Programs*, GAO-06-230 (November 2005) available at http://www.gao.gov/products/GAO-06-230.

The DEIS makes quick work of environmental justice issues by simply claiming that there aren't any.[208] A review of Table ES-14 shows that this claim is simply untrue.[209] Among Class I Areas, the North Cheyenne and Fort Peck Indian Reservations stand out as some of the most highly impacted areas for visibility. They further stand out as two of the most highly impacted areas in terms of degradation from this project. Clearly this is an environmental justice area that was not analyzed by BLM.

A further, previously-hidden public health and safety threat from coal came to light in December 2008, when 300 million gallons of coal ash sludge burst from a dam and spilled into the homes of fifteen families in Tennessee.[210] Kingston is not the only community with its safety threatened by coal ash dumps. There are 1300 such dumps spread across the country, filled with coal ash, arsenic, lead, mercury and selenium.[211] More than one hundred million tons of such ash are being dumped every year with no federal regulatory oversight.[212] These dumps have already polluted drinking water in dozens of states, and there is no comprehensive plan to arrest the problem.[213] Lead, cadmium, chromium, arsenic, nickel, zinc and copper are all found to be over safe levels in drinking water near ash dumps.[214]

### 2. Ecosystem impacts

As with human health, impacts to ecosystems from coal mining and burning have also been occurring for more than a century. Despite attempts to clean up the coal industry, habitat continues to be degraded and species continue to suffer. The most direct impact to ecosystems is direct destruction by surface mining. Not only is every living being in the path of a strip mine destroyed, the zone of impact can extend over large distances beyond the mine itself.

According to a large, national coal company, more than two million acres of land, an area larger than the State of Delaware, has been "reclaimed" after coal mining in the last fifteen years alone.[215] Of course, before being reclaimed more than two million acres of native ecosystems first had to be completely annihilated by strip mining. Many species in these areas will never return. Reclaimed areas, while better than abandoned strip mines, are highly degraded habitats, far from containing those species that originally populated the land. Outside the actual strip mine itself, water far downstream is often filled with sediment and sometimes toxic mine run-off, a further threat to sensitive species.

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[208] DEIS at ES-55.
[209] *Id.* at ES-59.
[210] Dewan, S., *Coal Ash Spill Revives Issues of Its Hazards*, New York Times (December 24, 2008) available at http://www.nytimes.com/2008/12/25/us/25sludge.html.
[211] Dewan, S., *Hundreds of Coal Ash Dumps Lack Regulation*, New York Times (January 6, 2009) available at http://www.nytimes.com/2009/01/07/us/07sludge.html.
[212] *Id.*
[213] *Id.*
[214] *See, e.g.*, Clean Air Task Force, *Impacts to Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines*, available at http://www.catf.us/publications/.
[215] Powder River Coal Company, *Environmental Issues*, available at http://www.ccsd.k12.wy.us/mines/PR/Environment.html.

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In addition, coal mines use tremendous amounts of water during mining operations. Nearby streams are often degraded or completely dewatered, with all of the attendant losses to aquatic life. Excessive groundwater pumping for coal mining and coal washing can destroy seeps and springs that wildlife relies on for survival. The DEIS lacks adequate analysis of these impacts. 10

A similar destruction of habitat occurs for coal-fired power plants, coal washing facilities, and the extensive infrastructure necessary to move a billion tons of coal hundreds and thousands of miles around the country. Coal-fired power plants are also users of tremendous amounts of water for cooling, with the added problem that water that is returned to streams and rivers after use is often at an abnormally high temperature that can kill or otherwise negatively impact aquatic life.

As discussed above, coal-fired power plants are also responsible for hundreds of coal ash slurry ponds that can be several hundred acres in size each. These slurry ponds destroy habitat and poison wildlife unfortunate enough to come into contact with them. Many of these ponds leak or leach toxic metals into downstream water sources, further impacting species. The DEIS lacks adequate analysis of these impacts.

Toxic metals are also deposited in streams via the air. Emissions can travel many miles from a power plant before naturally settling or being washed from the air by precipitation. Metals like mercury and selenium are persistent toxic pollutants that accumulate in living tissue, with the highest concentrations found at the top of the food chain. Aquatic species are often especially sensitive to these toxic metals. The DEIS lack adequate analysis of these impacts.

Yet another impact on ecosystems from coal is from acid rain. Two-thirds of all U.S. sulfur oxide ("Sox") emissions and one-quarter of all NOx emissions come from burning coal.[216] The impacts of these acidic emissions on sensitive species and other wildlife is horrendous. Three quarters of lakes and one-half of streams surveyed in the U.S. have been acidified by these types of emissions.[217] Acidification is detrimental to aquatic life and frequently responsible for fish kills, especially in the Mid-Atlantic and Northeast States.[218] In many lakes, every single fish species has been completely killed off.[219] This then leads to fish-eating birds like loons, and mammals, like otters, abandoning lakes that no longer provide food. 21

Acid rain also affects forest ecosystems. Slower growth, brown needles and dead trees are legacies of acid rain left along mountain ridges from Maine to Georgia.[220] In addition to killing leaves and needles directly, acid rain is absorbed into forest soils, changing soil chemistry. Unfortunately, soil nutrients can be dissolved by acid rainwater and then washed away.[221] Other, toxic chemicals can be released from minerals by acid rain, further damaging trees.[222]

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[216] EPA, *What is Acid Rain?* (June 8, 2007) available at http://www.epa.gov/acidrain/what/index.html.
[217] EPA, *Effects of Acid Rain – Surface Waters and Aquatic Animals* (Dec. 1, 2008) available at http://www.epa.gov/acidrain/effects/surface_water.html.
[218] *Id.*
[219] *Id.*
[220] EPA, *Effects of Acid Rain – Forests* (June 8, 2007) available at http://www.epa.gov/acidrain/effects/forests.html.
[221] *Id.*
[222] *Id.*

Air pollution presents a multi-billion dollar per year health crisis driven to a large extent by coal-fired power and mining. These billions are in addition to the economic loss associated with the tragedy of millions of children who are slow learners or mentally retarded because of pre-natal or infant exposure to coal-fired mercury emissions. Such impacts are not offset by a handful of local coal mining jobs. The DEIS lack adequate analysis of externalized economic costs.

There is an estimate of lost workdays associated with particulate emissions from coal-fired power plants. More than 3,000,000 days of worker productivity are lost in this country each year due to this single pollutant from coal.[223] On top of the health costs and lost productivity in the workforce, coal-fired air pollution is also responsible for lost crop and forest productivity due to ozone, particulates and acid rain.

4. Groundwater impacts

Both mining and CBNG drilling require dewatering of the area of interest. It appears that past NEPA analysis did not consider cumulative impacts on groundwater. Because of these combined activities, groundwater levels have now dropped much further than was predicted, in places up to 350 feet. The DEIS fails to analyze how much of this drawdown was due to mining. Twenty years after mining, water tables in reclaimed areas do not appear to be increasing significantly.[224] In some places BLM hasn't even bothered to measure groundwater reclamation efforts.[225] 10

As with other water-related issues described below, BLM kicks the analysis can down the road to the mine permit stage. Full impacts on groundwater of the project might only be analyzed after a Record of Decision has been issued.[226] It appears that no timely comprehensive analysis of groundwater has been undertaken in quite some time. The Cumulative Hydrologic Impact Analysis ("CHIA") that is quoted in the DEIS dates more than 20 years back to 1988.[227] That analysis appears to have predicted a total mining drawdown of 5 feet, far from the 350 feet that has occurred in some places.[228] It is not possible to complete NEPA legal requirements before an updated CHIA is completed and made available to the public for comment and to the decision maker for review.

In the absence of an updated CHIA, there appears to be no estimate of groundwater drawdown.[229] Likewise the total amount of groundwater drawdown and its effect on municipal supplies is not analyzed.[230] Impacts on groundwater quality also are not analyzed.[231] All of that analysis will presumably come later, after a decision to irretrievably commit federal resources

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[223] *Power Plant Emissions* at 6-2.
[224] *See id.* at 3-106.
[225] *Id.* at 3-110.
[226] *Id.* at 4-50.
[227] *Id.* at 4-52.
[228] *Id.* at 4-53.
[229] *Id.* at 4-55.
[230] *Id.* at 4-56.
[231] *Id.* at 4-58.

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has been made. Such impacts should be instead analyzed now and revealed to the public for comment before a ROD is issued.

### 5. Impacts to alluvial valley floors

Mining is prohibited on most alluvial valley floors and mining cannot affect alluvial valley floors downstream. This is mostly to protect flood irrigation agriculture. The DEIS approach to the issue is to declare that AVFs are not affected as far as BLM can tell so far, but BLM will look at the issue closely when mine permitting takes place. However, BLM must complete its analysis of AVF and provide that analysis to the public for comment in the DEIS. 22

### 6. Impacts to wetlands

The DEIS admits to not having conducted a formal delineation survey of wetlands. BLM claims that it is the Corps of Engineers job to perform such analysis and it will be done only when a mining permit is being reviewed. In other words, there will be thorough analysis of the issue but not before a Record of Decision is issued. About six hundred acres of wetlands within the lease tracts will be affected. As with the groundwater and AVF analysis above, BLM must complete its analysis of wetlands and OWUS and provide that analysis to the public for comment before a ROD is issued. 23

## E. The DEIS Fails to Disclose and Adequately Analyze Impacts to Threatened, Endangered, and Sensitive Species.

### 1. Ute Ladies'-Tresses Orchid

Ute ladies'-tresses orchids (ULTO) are listed as threatened, and identified as possibly being in the area. This wetlands orchid can survive underground without blooming for many years, so surveying must be done multiple times to assure that the orchids do not exist in an area. It will generally not flower in drought years or years that start wet or cold.[232] It blooms in late July to early September. It cannot be properly identified without the flower being present.[233] It has been observed on Antelope Creek at 5100 feet.[234] 24

In preparing the DEIS, BLM has not performed adequate surveys to confirm or deny the presence of this threatened flower. According to the ULTO Bi-Op for the Modified Idaho Roadless rule, "[b]ecause different plants come into bloom at different times within a population, a population must be visited several times during the growing season for an accurate count."[235] Not much is known about ULTO, but similar species can live up to 50 years and bloom only once every 20 years.[236]

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[232] *Id.* at G1-13.
[233] *Id.*
[234] *Id.*
[235] Fish and Wildlife Service, Biological Opinion – Modified Idaho Roadless Rule 14420-2008-F-0586 at 235.
[236] *Id.*

According to the FWS Interim Survey Requirements for ULTO (1992), "the Service recommends that surveys be conducted annually for three consecutive years." The DEIS implies that multiple surveys must be conducted over a three-year period.

This threatened flower could be impacted by both direct habitat destruction from strip-mining or through the continued dewatering of the area as a cumulative result of CBNG drilling and mining. Yet, the decision to go ahead with these leases could be made well in advance of acquiring the data necessary to know whether this species will be impacted. These lease applications were generally submitted in late 2005 and early 2006, allowing for plenty of time to perform multiple surveys in 2006, 2007 and 2008. There is no excuse for not properly surveying.

In August 2008, when several key surveys were done, much of Wyoming was abnormally dry; in August 2007, it was even worse. At the same time, it is possible that there were very wet springs during survey years. Absence of the ULTO flowers during surveys may have been the result of weather conditions.

The DEIS specifically notes that "[d]ormant Ute ladies'-tresses plants typically persist underground for one to many years and can only be reliably documented after several years of repeated surveys."[237] A Record of Decision is not possible until proper surveys for this threatened flower have been completed according to FWS protocol. Once proper surveys have been completed, an SEIS should be issued with the new information, available for public comment.

2. Greater sage-grouse

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There is an existing petition to list the greater sage-grouse as an endangered species under the Endangered Species Act. The greater sage-grouse is currently a sensitive species. The DEIS notes that "potential sage-grouse habitat is scarce throughout the general Wright analysis area." But before PRB mining, such habitat was not scarce at all.[238] Greater sage-grouse, as per their name, rely on sage for nearly every facet of their existence.[239]

More than 18,000 acres of habitat, most of it containing sage will be destroyed by this proposal.[240] The DEIS estimates that after decades of mining and reclamation, perhaps a century would be needed to restore sage habitat.[241] It is likely though that failed reclamation efforts and post reclamation grazing activities might mean most of this habitat is never restored to a quality that could again support greater sage-grouse. This project will effectively extirpate this bird from the lease and surrounding areas. This is yet another reason arguing that the best use of this public land is to select the No Action alternative.

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[237] DEIS at 50.
[238] *See* Center for Biological Diversity, *Map of Rare Species Occurrences in the Vicinity of the Wright Area Coal Leases* (Aug. 2009) ("Map").
[239] *Id.* at ES-49.
[240] *Id.* at ES-46.
[241] *Id.* at ES-47.

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### 3. Other threatened and endangered species

Both Canada lynx and piping plover use lands in the PRB mining area.[242] Both species are listed under the ESA as "threatened" species. Neither of these species is discussed in the DEIS. Such discussion should be part of a recirculated DEIS or SEIS. 25

## F. The DEIS Lacks Analysis of Reasonable Alternatives.

The range of alternatives given in this project makes it appear as though it were an insider sweetheart deal. In effect, the range of alternatives proposed is either to give the coal mining companies exactly what they asked for (Proposed Alternative), or to give them a whole lot more federal coal than they asked for (Alternative 2 and 3). In fact, the DEIS actually assumes that the companies that filed the applications to put these areas up for lease are the ones that get the bids. An alternative to analyze the possibility that another company might be high bidder on any one of these leases was rejected. Also, an alternative to wait a period to fully recover coal-bed natural gas ("CBNG") was rejected.[243] 2

The BLM Memorandum on maximizing resource recovery, BLM Instruction Memorandum 2006-153, suggests that waiting to mine only after CBNG is recovered is required on these tracts. As a minimum, this alternative should have been analyzed. Likewise, an alternative should have explored the possibility that the companies "winning" the "competitive" bidding process are not already known facts. 26

## G. The DEIS Must be Recirculated to Incorporate Information from the PRB Coal Review.

The DEIS notes that "[c]urrently, BLM is completing a regional technical study, called the PRB Coal Review, to help evaluate the cumulative impacts of coal and other mineral development in the PRB."[244] Perhaps this explains why the DEIS was largely devoid of cumulative impacts analysis. Such analysis is being undertaken through another venue. While this may be a reason, it is not a legally defensible rationale. 27

Throughout the DEIS, the PRB Coal Review is referred to as partially complete, its release impending, and it is discussed as a complete review of impacts of mining in the PRB. In short, the PRB Coal Review will contain a wealth of information that belongs in this DEIS. No rationale is given as to why the DEIS was published before the Review was complete. Certainly information essential to the public and the decision maker will be made available with the PRB Coal Review's publication. The DEIS should be withdrawn until the PRB Coal Review is published, recirculated when it is complete, or incorporated into a SEIS.

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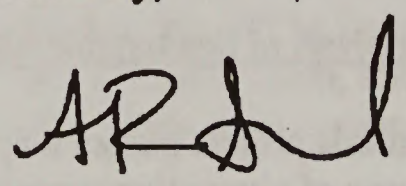
[242] *See* Map.
[243] DEIS at ES-27.
[244] *Id.* at ES-56.

## CONCLUSION

For the reasons set forth above, the Center requests that BLM choose the No Action alternative, or at the very least, prepare a revised DEIS or a SEIS that complies with NEPA.

Sincerely,



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BUREAU OF LAND
MANAGEMENT
CASPER FIELD OFFICE

WILDEARTH GUARDIANS
A FORCE FOR NATURE

August 25, 2009

Wyoming High Plains District Office
Bureau of Land Management
Attn: Sarah Bucklin
2987 Prospector Drive
Casper, WY 82604

**Re: Wright Area Draft EIS Comments**

Dear Ms. Bucklin:

WildEarth Guardians submits the following comments on the Wright Area Coal Draft Environmental Impact Statement ("DEIS"), which was prepared pursuant to the National Environmental Policy Act ("NEPA"). The DEIS analyzes the impacts of the Bureau of Land Management's ("BLM's") proposal to offer four lease-by-applications ("LBAs") that collectively would allow corporations to strip mine upward of 4.3 billion tons of coal from the Powder River Basin of northeastern Wyoming (hereafter "Wright LBAs"), leading to a number of environmental impacts, including the release of nearly 8.0 billion tons of carbon dioxide ("CO2") (based on an emission factor of 1.82922 tons of CO2/ton of coal), a heat trapping greenhouse gas that is fueling global warming, once the leased coal is mined and burned. *See* Table below.

**Proposed LBAs, Acreage, Tonnage, CO2 Emissions, and Mine Company Proponent.[1]**

| Lease by Application | Acreage | Tons of Coal | Tons of Carbon Dioxide from Burning | Mine Company Proponent (Mine and Rank In U.S. Production) |
|---|---|---|---|---|
| North Highlight Field | 2,613.50 | 669,300,000 | 1,224,296,946 | Arch (Black Thunder, #2) |
| South Highlight Field | 1,976.69 | 320,000,000 | 585,350,400 | Arch (Black Thunder, #2) |
| West Highlight Field | 2,370.52 | 1,056,100,000 | 1,931,839,242 | Arch (Black Thunder, #2) |
| West Jacobs Ranch | 5,944 | 1,142,100,000 | 2,089,152,162 | Rio Tinto Energy America (Jacobs Ranch, #3) |
| North Porcupine | 5,795 | 777,400,000 | 1,422,035,628 | Peabody (North Antelope/Rochelle, #1) |
| South Porcupine | 3,185.95 | 405,400,000 | 741,565,788 | Peabody (North Antelope/Rochelle, #1) |
| **TOTALS** | 21,866.44 | 4,370,300,000 | 7,994,224,166 | |

[1] Acreage and tonnage figures based on DEIS; CO2 emissions based on Energy Information Administration factor of 212.7 lbs/mmBtu of coal; production ranking from Energy Information Administration.

The proposed action is unprecedented. The BLM has never offered to lease such a large amount of coal through a single EIS for at least the last 20 years. What's more, the BLM is offering to lease such a large amount of coal in a day of age where scientific knowledge of human-caused global warming is more advanced than ever. This growing body of knowledge points to human-caused releases of greenhouse gases, like carbon dioxide, as key drivers of global warming. Global warming is dramatically changing the climate, threatening economic stability, national security, public health, and natural ecosystems. In recognition of the need to confront global warming, a number of states in the American West, including Colorado and New Mexico, have adopted ambitious greenhouse gas reduction goals.[2] Even the U.S. Environmental Protection Agency has recognized: 5

> [G]reenhouse gases in the atmosphere endanger the public health and welfare of current and future generations. Concentrations of greenhouse gases are at unprecedented levels compared to the recent and distant past. These high atmospheric levels are the unambiguous result of human emissions, and are very likely the cause of the observed increase in average temperatures and other climatic changes. The effects of climate change observed to date and projected to occur in the future—including but not limited to the increased likelihood of more frequent and intense heat waves, more wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems—are effects on public health and welfare[.]

74 Fed. Reg. 18886-18910.[3]

Not only that, but the BLM is offering to lease such a large amount of coal in a day of age where clean, renewable energy is becoming more affordable and widely available. Even Secretary of the Interior Ken Salazar has recognized this and directed that, "Encouraging the production, development, and delivery of renewable energy is one of the [Interior] Department's highest priorities." Secretarial Order No. 3285 (March 11, 2009).[4] In the State of Wyoming, this direction could not be more imperative. The wind energy potential in Wyoming along is estimated to be 883 million megawatt-hours/year ("MWh/y"), enough to more than meet the energy demands of the entire American West. *See* Figure below. Given that much of Wyoming's wind energy potential located on public lands managed by the BLM, it is unbelievable that the BLM would propose lease more than 4 billion tons of coal in the Powder River Basin. At the least, it is unclear how the agency is addressing the Interior Secretary's directive in Secretarial Order No. 3285 by proposing the Wright LBAs. 14

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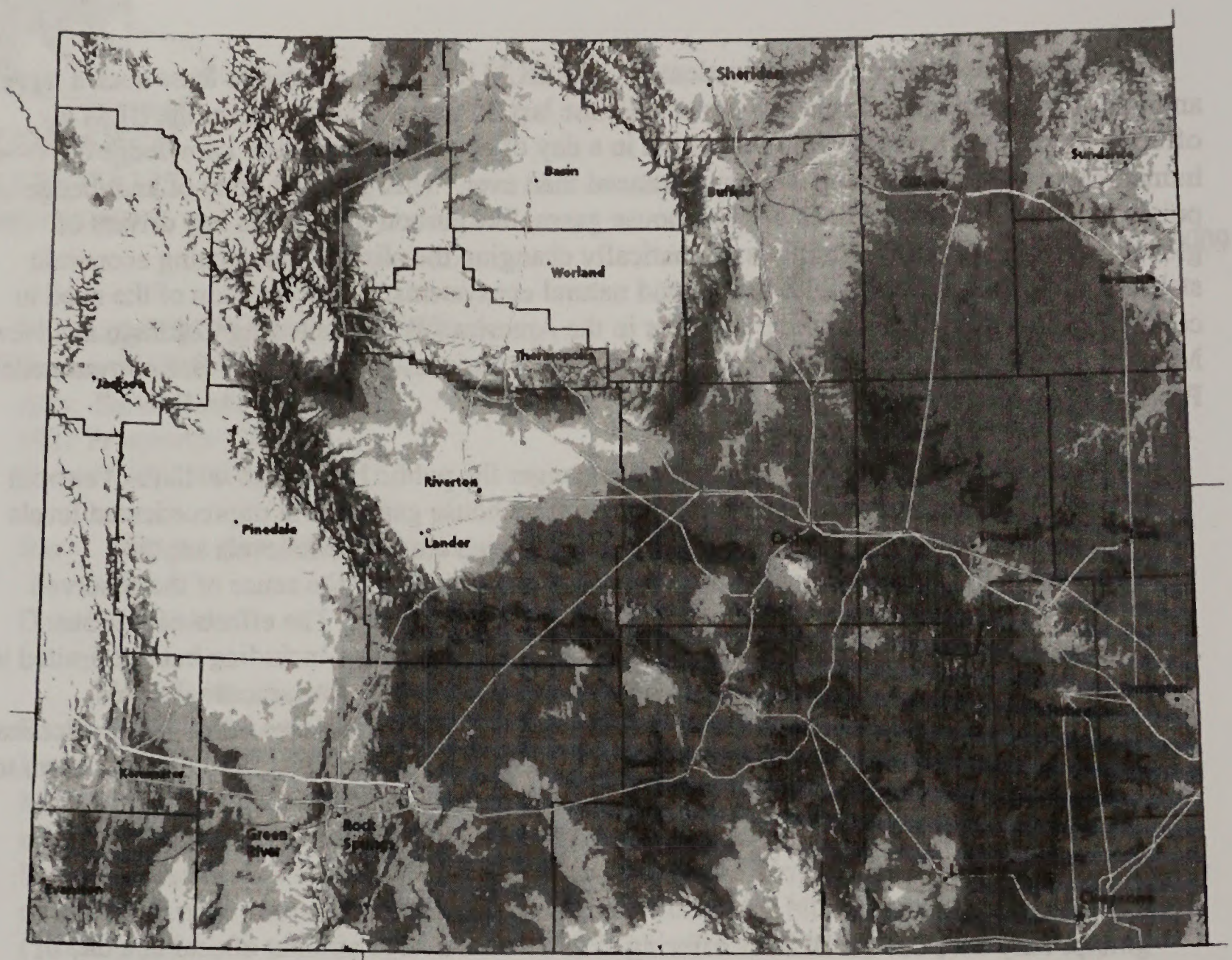
[2] *See* **Exhibit 1**, greenhouse gas reduction Executive Order signed by Colorado Governor Bill Ritter and **Exhibit 2**, greenhouse gas reduction Executive Order signed by New Mexico Governor Bill Richardson.

[3] *See* **Exhibit 3**.

[4] *See* **Exhibit 4**.




**Wind Energy Potential in Wyoming. Blue is "Superb," red is "Outstanding," purple is "Excellent," pink is "Good," and orange is "Fair."[5]**

The BLM's proposal appears wholly out-of-touch with the current state of science, the range of energy alternatives available, and with Interior Department policy. As such we do not support the proposed Wright LBAs and urge the BLM to reject offering the proposed leases. We are very concerned that the agency is not fully addressing the global warming impacts of the proposed Wright LBAs, nor is the agency addressing the need for renewable energy. Further, we have serious concerns that the BLM is illegally leasing coal under the LBA process, thereby preventing the agency from fully analyzing and assessing the environmental impacts of regional coal leasing in the Powder River Basin and from providing the public a full opportunity to comment on regional leasing levels. We are further concerned that the BLM has not addressed serious air quality impacts, has not analyzed a range of reasonable alternatives, and has failed to address other impacts associated with the Wright LBAs in the DEIS. These comments are timely submitted within 60 days of June 26, 2009, the date the notice of availability for the DEIS was published in the Federal Register. *See* 74 Fed. Reg. 30570.

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[5] Map from Renewable Energy Atlas of the Western States. *See* **Exhibit 5**.

## 1. The Purpose and Need for the DEIS is Unclear and Appears too Narrow

An EIS is required to "briefly specify the underlying purpose and need to which the agency is responding in ***proposing the alternatives including the proposed action***." 40 CFR § 1502.13 (emphasis added). Thus, the purpose and need drives the development of alternatives in an EIS. Consequently, it is imperative under NEPA that a stated purpose and need in an EIS be clear, not be so narrow as to preclude reasonable alternatives, and above all ensure well-informed decisionmaking that ensures compliance with applicable laws and regulations and full consideration of environmental impacts. Unfortunately, in the case of the DEIS for the Wright LBAs, the purpose and need appears flawed in several regards.

### a. The Purpose and Need is not Stated

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The "Purpose and Need" section in the DEIS at pages 1-16—1-18 appears to fail to state the underlying purpose and need to which the BLM is responding in proposing the alternatives in the DEIS. The section is nearly two pages long and simply does not identify the actual purpose and need to which the BLM is responding the alternatives in the DEIS.

### b. The BLM Appears to Have Inappropriately Limited the Scope of its Decisionmaking Authority

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Notwithstanding the lack of a clearly defined "Purpose and Need" section, it appears the BLM may believe the purpose and need is to respond to the LBAs "for the purpose of generating electric power for the public." DEIS at 1-17. If this is the case, then the "Purpose and Need" is wholly inappropriate and illegally constrains the agency's decisionmaking authority.

Indeed, under BLM's coal leasing regulations dealing with LBAs, the agency first and foremost has a nondiscretionary duty to ensure that any LBA "is consistent with the applicable regulations," would not "compromise the regional leasing process defined in [43 CFR § 3420.3]," and, above all, "would not be contrary to the public interest" on the basis of environmental or other sufficient reasons. *See* 43 CFR §§ 3425.1-8(a)(1)—(3). Nowhere in the purpose and need are these overriding duties addressed. This raises serious concerns that the BLM has constrained its ability to reject the proposed LBAs in accordance with 43 CFR § 3425.1-8, or at least failed to retain the ability to develop alternatives in order to fulfill the agency's legal obligations.

We do understand that there is a general need to generate electric power for the public. However, there are a number of ways to generate electric power for the public, including through renewable energy development, through natural gas, through greater efficiencies, and through conservation of energy. By narrowing its focus on coal, the BLM has, limited its ability to consider these other energy alternatives. Furthermore, by narrowing its focus on coal, the BLM has constrained its ability to adequately analyze and assess more cost-effective alternatives for generating electricity. As will be explained further in these comments, the cost of the CO2 associated with burning the coal proposed to be leased through the Wright LBAs could be as

much as $165,161,001,829.56. **That's more than $165 billion.**[6] These potential costs indicate that if energy affordability is going to be a component of the BLM's purpose and need, the agency cannot limit itself solely to considering coal as a source of electricity.

Overall, if the BLM is going to develop a purpose and need that revolves around providing affordable and reliable electric power for the public, the agency cannot limit its consideration only to coal. Not does such a narrow purpose and need prevent the BLM from fulfilling its legal obligations under 43 CFR § 3425, but it constrains the ability of the agency to develop a range of reasonable alternatives. Particularly in the context of the impacts of the environmental impacts of the proposed Wright LBAs—including global warming, air quality, and other impacts—the agency must broaden the scope of its purpose and need and DEIS to ensure a range of alternatives is rigorously explored. As it stands, the only action alternatives proposed so far involve mining coal, a clear indication that the purpose and need is far too narrow. 14

**2. The DEIS Fails to Adequately Analyze and Assess the Global Warming Impacts of the Wright LBAs in Accordance with NEPA** 6

Although we are pleased to see the BLM disclose the greenhouse gas ("GHG") emissions associated with burning the coal that may be leased through the Wright LBAs, we are concerned that the BLM is not adequately analyzing all direct, indirect, and cumulative GHG emissions, nor analyzing and assessing the global warming impacts associated with these emissions.

**a. The DEIS Fails to Assess the Significance of the Direct, Indirect, and Cumulative GHG Emissions Associated with the Wright LBAs**

GHG emissions from burning the coal authorized by the Wright LBAs are a reasonably foreseeable consequence of this federal action, as the BLM has recognized. We appreciate the discussion of climate change in the EIS and the BLM's effort to disclose direct, indirect, and cumulative GHG emissions. However, the analysis is incomplete under NEPA and CEQ regulations because the BLM failed to assess the significance of the direct, indirect, and cumulative GHG emissions associated with the Wright LBAs.

The DEIS does disclose the GHGs expected to be released as a result of burning the coal leased under the Wright LBAs and also briefly discloses that global warming caused by human-released GHG emissions is contributing to a number of negative consequences, particularly in the American West. *See* DEIS at 4-112—4-115. Unfortunately, the DEIS ends there. Indeed, while the DEIS discloses the GHG emissions associated with burning the coal proposed to be leased through the Wright LBAs, the DEIS entirely fails to assess the significance of these emissions, or make any effort to analyze how such emissions are likely to contribute to the negative consequences of global warming. CEQ regulations clearly require that an EIS discuss

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[6] This dollar figure is based on the current price of carbon as established by the European Union (in U.S. dollars). As of August 6, 2009, the trading price of $CO_2$ in the European Union was 14.39 euros per ton, equivalent to US $20.66 per ton. *See* POINT CARBON EUA OTC ASSESSMENT, http://www.pointcarbon.com/.

"[d]irect effects and their significance," "[i]ndirect effects and their significance," as well as analyze and assess cumulative impacts. 40 CFR §§ 1502.16(a), (b) and (d).

In this case, it appears as if the GHG emissions associated with the Wright LBAs will be more than significant. The proposal will make available 4.370 billion tons of coal.[7] Over the life of the leases, some of which will extend mine operations for as long as 28.6 years, the coal, once burned, will emit nearly 8,000,000,000 tons of carbon dioxide.[8] This amount of GHGs is greater than the amount of total GHG emissions released in the United States in 2007.[9] If the BLM decided to withhold the Wright LBAs from leasing, the GHG reductions caused by that decision would be equivalent to stopping all GHG-emitting activity in the United States for an entire year, resulting in a global GHG emissions reduction of 18%.

Not only that, but the GHG emissions associated with the Wright LBAs appears significant just in terms of the magnitude of contribution to the United States' GHG emissions from this single BLM decision. Consider this:

- CO2 emissions make up more than 85% of the United State's total greenhouse gas emissions;[10]
- Coal-fired power plants release 32% of total CO2 emissions, more than any other source in the nation;[11]
- The Powder River Basin produces 42% of all coal burned in coal-fired power plants in the United States, more than any other region of the country (*see* DEIS at 4-115);
- When burned, coal from the Powder River Basin produce 13.9% of all CO2 emissions in the United States, more than any other region of the country (*Id.*); and
- The Wright LBAs, in proposing to mine upwards of 4.3 billion tons of coal from the Powder River Basin, would release nearly 8 billion tons of GHGs and represent the largest coal leasing proposal currently pending before the BLM (and likely the largest coal leasing proposal ever issued by the agency).

To sum it all up, the Wright LBAs would open the door for the largest coal mining proposal in the biggest coal production region, which is responsible for the largest amount of coal-fired power plant CO2 emissions, which are the largest source of carbon dioxide emissions in the United States, within which CO2 comprises the vast majority of all GHGs released. In all likelihood, the BLM's decision regarding the Wright LBAs will represent the single largest impact to GHG emissions in the United States ever before made.

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[7] This is the amount of recoverable coal from all 6 tracts under a high development scenario.

[8] Based on the BLM's emission factor of 212.7 lbs of CO2/MMBtu and BLM's estimated Btu content of 8,600/pound of coal. *See* DEIS at 4-118.

[9] In 2007, the United States emitted 7,150.1 million metric tons of $CO_2$ equivalent, which made up 18.7 percent of the world's GHG emissions. *See* **Exhibit 6**, EPA, 2009 U.S. GREENHOUSE GAS INVENTORY REPORT.

[10] *See* **Exhibit 7**, U.S. Greenhouse Gas Emissions and Sinks Fast Facts, 2007. EPA.

[11] *Supra.* Note 9.

In accordance with NEPA, the BLM must assess the significance of the direct, indirect, and cumulative GHG emissions associated with the Wright LBAs and fully discuss climate change impacts to a degree commensurate with the very significant impact of these leases.

**b. The DEIS Fails to Quantify the Cost of GHG Emissions**

The NEPA requires that the BLM "identify and develop methods and procedures . . . which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations." 42 USC § 4332(2)(B). The DEIS does not quantify the environmental effects of climate change, and in particular the cost of GHG emissions.

The Ninth Circuit held that it was arbitrary and capricious for a federal agency to not include a cost or benefit of carbon emissions in a NEPA document for car gas mileage standards. *Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1203 (9th Cir. 2008). The Court ordered the agency to include a monetized value of carbon emissions in the NEPA document, reasoning in part that "the value of carbon emissions reduction is certainly not zero." *Id.* at 1200, 1203. Here, the BLM has made the same error: it has omitted any monetization of the costs of carbon emissions that will result from the burning of coal to be mined under the Wright LBAs. This omission is even worse here than the omission in *National Highway Traffic Safety Administration*, because the burning of Wright LBAs' coal will result in emissions greater than total U.S. GHG emissions from all sources in 2007. Therefore, the BLM must monetize carbon emissions associated with the Wright LBAs and include those numbers in any EIS.

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In *National Highway Traffic Safety Administration*, the court listed a number of possible values in dollars per ton of $CO_2$ emissions that are mitigated (i.e., not emitted). The dollar amounts ranged from a low of $3 per ton to a high of $50 per ton $CO_2$. *See* 538 F.3d at 1199. As of August 6, 2009, the trading price of $CO_2$ in the European Union was 14.39 euros per ton, equivalent to US $20.66 per ton.[12] The BLM could easily use these per ton prices as a starting point for calculating the present-day cost of $CO_2$ emissions that it will cause by leasing the Wright LBAs. Using the above European Union carbon market price, the emissions from burnt WALBA coal have a mitigation value of $163,235,000,000.[13] In other words, if a carbon market were set up in the United States, carbon polluters would pay $163 billion to keep the Wright LBAs' coal in the ground. This is a significant cost that the EIS must at least attempt to disclose.

**c. The DEIS Fails to Adequately Analyze and Assess Global Warming Impacts**

Also of concern is that the DEIS fails to analyze and assess how the direct, indirect, and cumulative GHG emissions will influence global warming. As the BLM indicates in the DEIS, it can be assumed that the release of GHGs associated with the Wright LBAs will contribute to

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[12] *Supra.* Note 6.

[13] $20.66 per ton x 7,901 million tons = $163,235,000,000.

global warming. Yet the BLM makes no attempt to analyze and assess such impacts and the magnitude of contribution to global warming.

The BLM asserts that "Tools necessary to quantify incremental climatic changes…for the projected development activities in the PRB [Powder River Basin] are presently unavailable. As a consequence, impact assessments of specific anthropogenic activities cannot be performed." DEIS at 4-110. We are skeptical of this assertion, but nevertheless, even if the BLM is correct, the DEIS fails to comply with NEPA.

The CEQ regulations require that an agency "evaluate reasonably foreseeable significant environmental effects on the human environment," even where information relevant to making this evaluation is "incomplete or unavailable." 40 CFR § 1502.22. If this is the case, the agency must clearly show that the information is "lacking" by providing what credible scientific information it does have on these reasonably foreseeable impacts and making an effort to analyze these impacts based on this information. *Id.* What information the agency must provide depends upon the costs of obtaining the information. *Id.*

For example, the agency must include "information relevant to reasonably foreseeable adverse impacts" even if it is "incomplete," if it is "essential to a reasoned choice among alternatives and the overall costs of obtaining it aren't exorbitant." 40 CFR § 1502.22(a). Even where the costs are exorbitant, or the means of obtaining the information are unknown, the agency must still provide information on reasonably foreseeable adverse impacts. This information includes:

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> (1) A statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

40 CFR § 1502.22(b). Under this section, reasonably foreseeable "includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." *Id.*

Despite the BLM's claim that tools are unavailable to analyze and assess the global warming impacts associated with the Wright LBAs, nowhere in the DEIS is it apparent that the requirements of 40 CFR § 1502.22 have been met. This is particularly troublesome given the apparent significance of the direct, indirect, and cumulative GHG emissions associated with the Wright LBAs, as well as the BLM's general disclosure regarding the catastrophic impacts of global warming. As it stands, the DEIS fails to comply with NEPA with regards to the analysis and assessment of the global warming impacts of the Wright LBAs.

**d. The DEIS Fails to Adequately Analyze and Assess the Cumulative Impacts of Department of Interior-authorized Activities**

27

The DEIS fails to analyze and assess the cumulative impacts of other actions undertaken by the Department of Interior on global warming. We are especially concerned that the Department of Interior is not programmatically analyzing its GHG emissions and global warming impacts of its operations and activities. Because the BLM is an agency within the Department of Interior, it is imperative that the DEIS fully analyze and assess the cumulative impacts of other Interior Department activities.

In fact, there are a number of projects that release GHGs and cumulatively contribute to global warming, that are under control by the Department of Interior, and that therefore must be addressed pursuant to NEPA *See e.g.*, 40 CFR § 1502.16 (an EIS "will include the environmental impacts of the alternatives including the proposed action"); 40 CFR § 1508.8 (effects include "ecological (such as the effects on natural resources and on the components of, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative"); and 40 CFR § 1508.7 (cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions"). The projects authorized or proposed to be authorized by the Department of Interior and its agencies include:[14]

- Numerous other coal leases proposed in the Rocky Mountain West, including the Dakota Westmoreland coal lease modification proposed in March of 2009 by the BLM in North Dakota;[15]
- The Greens Hollow coal lease proposed in 2008 by the BLM in the Price Field Office of Utah;[16]
- The Peabody Twentymile Coal Company Application for Coal Lease approved in 2008 by the BLM in the Little Snake Field Office of Colorado;[17]
- The Absaloka Mine South Extension Coal Lease approved in 2008 by the Bureau of Indian Affairs on the Crow Indian Reservation in Montana;[18]
- The Red Cliff coal mine proposed in 2009 for authorization by the BLM in the Grand Junction Field Office of western Colorado;[19]

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[14] Due to the large size of the following documents, we are unable to submit the following documents as electronic attachments. We provide the weblinks for the BLM to reference and will submit hard copies as follow up via U.S. Mail to ensure the agency has full access to this data in order to adequately analyze and assess cumulative impacts.

[15] *See* Environmental Assessment available at http://www.blm.gov/pgdata/etc/medialib/blm/mt/field_offices/north_dakota.Par.96662.File.dat/DWCea.pdf.

[16] *See* EIS available at http://www.blm.gov/pgdata/etc/medialib/blm/ut/price_fo/Coal.Par.48515.File.dat/Greens%20Hollow%20DEIS.pdf.

[17] *See* Environmental Assessment available at http://www.blm.gov/pgdata/etc/medialib/blm/co/information/nepa/little_snake_field/2008_documents.Par.4735.File.dat/CO-100-2008-058EA.pdf.

[18] *See* Record of Decision available at www.deq.state.mt.us/eis/Absaloka/ROD.pdf.

[19] *See* DEIS available at http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/red_cliff_mine/documents.html.

- Tar sands and oil shale development proposed in 2008 by the BLM for Colorado, Utah, and Wyoming.[20]
- The Toquop coal-fired power plant in Nevada, which is proposed to be authorized by the BLM;[21] and
- The Desert Rock coal-fired power plant in New Mexico, which is proposed to be authorized by the Bureau of Indian Affairs.[22]

The BLM must consider the impacts of its proposal to authorize the Wright LBAs cumulatively with other Department of Interior authorized activities that also contribute to global warming. Until such time as BLM analyzes the cumulative impacts of greenhouse gas emissions from other Department of Interior authorized activities, BLM cannot move forward with the Wright LBAs in compliance with NEPA.

**e. The DEIS Incorrectly Claims the No Action and Action Alternatives Will not Differ in Their Climate Change Impacts**

6

As already discussed, the quantity of recoverable coal that will be made available by the Wright LBAs is gigantic: 4.370 billion tons is almost four times the total U.S. coal production in 2007.[23] This is a greater amount than all of the coal reserves in Kentucky, West Virginia, and Illinois combined.[24] On an annual basis, coal production from the six tracts will reach a maximum of 270 million tons per year. DEIS 4-12, 4-14. 270 million tons per year is equal to 38.4% of annual production for all states excluding Wyoming, based on 2008 data.[25] Moreover, the Wright Area, including the LBAs at issue here, is projected to produce the majority of Wyoming coal through 2020 based on both lower and upper production scenarios. DEIS 4-10, 4-11.

The DEIS claims that "it is not likely that selection of the No Action Alternatives would result in a decrease of U.S. $CO_2$ emissions attributable to coal-burning power plants in the longer term," because if the Wright LBAs are not leased, other coal mines will produce the same quantity of coal as would have been produced by these 6 tracts to meet annual coal demand for electricity generation. DEIS 4-122. This conclusion is at best a gross oversimplification, and at worst entirely impossible. If the six tracts are not leased, it will be very difficult for domestic coal mines to provide an additional 38.4% of annual coal production. Further, if these tracts are never leased, other coal-producing states will not be able to replace the 4.370 billion tons made unavailable in Wyoming. Coal-fired power plants would have to import coal from other

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[20] *See* EIS available at http://ostseis.anl.gov/eis/guide/index.cfm.

[21] *See* DEIS available at http://www.blm.gov/nv/st/en/fo/ely_field_office/blm_programs/energy/toquop_energy/toquop_draft_eis.html.

[22] *See* DEIS available at http://www.desertrockenergyeis.com/.

[23] *See* ENERGY INFORMATION ADMINISTRATION (EIA), TABLE 1: COAL PRODUCTION AND NUMBER OF MINES BY STATE AND MINE TYPE, DOE/EIA 0584 (2007), http://www.eia.doe.gov/cneaf/coal/page/acr/table1.pdf.

[24] *See* EIA, TABLE 14: RECOVERABLE COAL RESERVES AND AVERAGE RECOVERY PERCENTAGE AT PRODUCING MINES BY STATE, 2007, 2006, DOE/EIA 0584 (2007), http://www.eia.doe.gov/cneaf/coal/reserves/table14_07.pdf.

[25] *See* EIA, TABLE 2. U.S. COAL PRODUCTION BY COAL-PRODUCING REGION AND STATE, 2004 – ATEN, (2008), http://www.eia.doe.gov/cneaf/coal/page/special/feature.html.

countries to make up the 38.4% percent annual production that the Wright LBAs represent. Large-scale coal importation is unlikely because of the nation's focus on energy independence and because of the political influence of coal industry lobbyists.

In light of the unlikelihood that other domestic coal mines could feasibly supply an additional 4.370 billion tons of recoverable coal to the market, the DEIS is incorrect in stating that the decision to lease or not lease would not have different effects on climate change. The authorize the Wright LBAs will in fact contribute significantly to national GHG emissions for a period of years.

Even if it were remotely possible that coal-producing regions outside Wyoming could provide an additional 4.370 billion tons of coal to the market, the national cost of coal per ton will likely rise because coal mining is more expensive in other regions. The DEIS recognizes that the PRB has cost advantages over other regions. DEIS 4-122. A higher per-ton price for coal would make coal-fired electricity more expensive, which in turn would make other sources of electricity—in particular renewable energy sources such as wind and solar—more competitive with coal. A shift to non-coal sources of electricity, whether it is natural gas, wind and solar, or nuclear, would result in a significant decrease in $CO_2$ emissions. Thus the no-lease alternative would likely result in lower climate change impacts even if other coal producing regions were capable of producing an equivalent quantity of coal, albeit at higher cost. As it stands, the BLM has not adequately analyze and assessed the potential global warming impacts associated with the proposed alternatives and the No Action Alternative, in accordance with NEPA. 14

Furthermore, the BLM's conclusion that carbon emissions will be the same regardless of the alternative chosen is also an abdication of the agency's responsibility to take a hard look under the NEPA. BLM cannot avoid discussing the global warming impacts of the proposed actions, and their significance, by assuming that emissions from other sources not under the agency's control will have an equal or greater impact on climate change than emissions from the Wright LBAs. If either alternative is chosen, the environmental consequence will be that $CO_2$ emissions will come from the Wright LBAs, and not from other coal mines in other regions. Thus, the DEIS must discuss this action's climate change impacts as if one of these action alternatives were chosen.

### f. The DEIS Fails to Consider Reasonable Alternatives to Address the Global Warming Impacts of the Wright LBAs

The range of alternatives "is the heart of the environmental impact statement." 40 CFR § 1502.14. It is well understood that "NEPA requires that an agency 'rigorously explore and objectively evaluate all reasonable alternatives.'" *Utahns for Better Transp. v. Dept. of Transp.*, 305 F.3d 1152,1168 (10th Cir. 2002) *quoting* 40 C.F.R. § 1502.14(a), *modified on rehearing Utahns for Better Transp. v. Dept. of Transp.*, 319 F.3d 1207 (2003). The alternatives discussed should provide different choices from which decisionmakers and the public can make an informed choice after considering the environmental effects of the alternatives. *See Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853 (9th Cir. 2004). The range of alternatives should also "include reasonable alternatives not within the jurisdiction of the lead agency," and "include appropriate mitigation measures not already included in the proposed action or 2

alternatives." 40 CFR § 1502.14. The alternatives discussed in the DEIS do not meet these requirements in the context of addressing GHG emissions and global warming impacts.

The DEIS must consider a wider range of reasonable alternatives. Alternative 3 is practically identical to Alternative 2. Because of this similarity, the EIS effectively considers two alternatives that differ from the Proposed Action, hardly a "range" under NEPA. What's more, all of the alternatives are assumed to have practically identical environmental effects on global warming. *See* DEIS 4-122. Because identical effects are incorrectly assumed, the DEIS fails to discuss the specific environmental effects of each alternative as required by 40 CFR § 1502.16.

We strongly urge the BLM to rigorously explore and objectively evaluate the following alternatives in order to ensure to sharply define the issues and ensure a well-informed decision that mitigates significant environmental impacts:

- **The range of alternatives should include tonnage and acreage limits to leases so that changes can be made in the future to respond to GHG emissions regulation.** The DEIS discusses the relevance of potential GHG regulation under new legislation that may be enacted later this year. DEIS 4-116. Given the likelihood that some form of carbon regulation will be put in place before the coal from Wright LBAs is mined, it would be prudent for the BLM to include upper limits in the lease agreements. These limits will create flexibility for the BLM in the future to change or modify leases in response to shifts in national energy policy towards lower-carbon, renewable sources. While BLM cannot predict what legislation will be enacted, flexibility would leave the door open for unpredictable changes without compromising current coal production. Rather than writing-in tonnage or acreage limits to the leases, the same alternative could be achieved by presenting an alternative that contains a coal quantity *less than* the quantity in the Proposed Action. This alternative is especially reasonable in light of the fact that the DEIS discloses that all three mines seeking leases have a remaining life of more than 10 years. 5

- **The range of alternatives should include the establishment of a renewable energy fund to spur solar and wind development in Wyoming to mitigate carbon emissions and to create long-term jobs.** To mitigate climate change impacts without compromising the national power supply, a renewable energy fund should be established based on a per-ton tax on coal from the Wright LBAs. This fund should be used to spur development of wind and solar resources in the Powder River Basin and in Wyoming. It is a fact that Wyoming contains significant wind resources; significant solar potential exists, as well.[26] These resources have not been adequately developed, especially solar. DEIS 4-28, 4-29. Federal funding for wind and solar could help to diversify the local economies and create jobs that last indefinitely, because sun and wind will last forever. In contrast, coal mining jobs will disappear as soon as the coal runs out. 2

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[26] *Supra*. Note 5.

This mitigation strategy may not be within the BLM's jurisdiction. However, NEPA regulations require consideration of alternatives that lie outside the lead agency's jurisdiction. *See* 40 CFR § 1502.14. Moreover, wind turbines could be sited on reclaimed mine sites; under this scenario the BLM would have jurisdiction over projects on BLM land.

- **The range of alternatives should include a requirement that the coal lessees purchase carbon offsets.** Carbon offsets are stocks or shares that represent a certain amount of $CO_2$ emissions that have been prevented or mitigated. The mining companies are not currently paying the price for externalities caused by $CO_2$ emissions from burning coal. A 2008 report estimated those externalities cost society $515 billion per year.[27] These externalities include all of the effects of climate change, as well as regional air and water pollution, and mining accidents. Mine companies can start to begin paying for the full cost of using coal for power generation by purchasing offsets to mitigate some of the damage that is being caused by emissions from coal.

- **The range of alternatives should include a requirement that all carbon emissions from Wright Area coal used for electricity generation be captured and sequestered geologically.** The vast majority of the coal to be mined as a result of the Wright LBAs will be burned for power generation and carbon emissions will be released into the atmosphere. To mitigate this very significant amount of emissions, the range of alternatives should include a plan to require carbon capture and sequestration ("CCS") of emissions equivalent to the amount produced by burning the Wright LBAs' coal. CCS could be required as a contract condition for all coal sold from the Wright Area mines. In the alternative, the BLM could set a per-ton tax on the coal and use the revenue to develop and implement a CCS project that captures an equivalent amount of carbon emissions as would be generated by burning the Wright LBAs' coal. BLM could site the CCS facility on BLM land, thus keeping the project within BLM jurisdiction. Even if the CCS project falls entirely outside BLM jurisdiction, that fact does not excuse the BLM from considering it as an alternative. *See* 40 CFR § 1502.14.

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- **The range of alternatives should include a Renewable Energy Standard ("RES") for coal mine operators.** To reduce direct emissions from operations, the leases should include an RES that requires operators to rely on a certain percentage of renewable energy to power vehicles, machinery, and buildings. Many states will require that as much as 25 percent of all electricity is generated by renewable sources by 2025.[28] Taking some of this renewable power and using it to power the mines is a realistic and reasonable way to mitigate emissions without placing a large burden on the coal extraction industry. According to the DEIS, GHG emissions associated with electricity use at the three mines will amount to 296,166 tons of CO2e. *See* DEIS at 3-307. If

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[27] GREENPEACE INTERNATIONAL, THE TRUE COST OF COAL (2008), http://www.greenpeace.org/raw/content/international/press/reports/true-cost-coal.pdf. The report presents the cost as 360 billion euros. Converted to dollars as of August 14, 2009, that cost is $515 billion.

[28] *See* PEW CENTER ON GLOBAL CLIMATE CHANGE, RENEWABLE AND ALTERNATIVE ENERGY STANDARDS, http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm.

renewable energy was used, these GHG emissions could be significantly mitigated. Additionally, employing renewable energy would improve local air quality.

- **The range of alternatives should include a requirement that all mine vehicles be run on alternative fuels.** Alternative fuels include hydrogen, biodiesel, natural gas, and electricity. Similar to the RES alternative above, an alternative fuels requirement for vehicles would reduce direct GHG emissions associated with mining activities, and simultaneously improve local air quality. 5

### 3. The DEIS Fails to Adequately Analyze and Assess PM Impacts

The DEIS fails to adequately analyze and assess the particulate matter impacts of the Wright LBAs. In particular, the DEIS fails to address the fact that National Ambient Air Quality Standards ("NAAQS") for PM-10 (particulate matter less than 10 microns in diameter) have been exceeded on numerous occasions, and fails to provide information and analysis demonstrating that PM-10 mitigation measures will effectively limit concentrations to ensure compliance with the NAAQS. 19

#### a. The DEIS Contains Misleading Information About Past PM-10 Exceedances

The DEIS at F-16 states there were 27 valid $PM_{10}$ exceedances "in the group of mines located south and east of the town of Wright." The mines to the south and east of Wright are the mines that have applied for maintenance tracts here: Jacobs Ranch, Black Thunder, and North Antelope-Rochelle Mine. It is unclear why the DEIS would not state that the 27 valid exceedances occurred at the mines that have submitted applications for leases. Moreover, section 3.4.2.2 on "Environmental Consequences" does not even mention the 27 exceedances; rather, it states that there were twelve $PM_{10}$ exceedances that the BLM asserts were almost all explained by elevated wind speeds. *See* DEIS at 3-45. The discrepancy between these two reported numbers of exceedances calls into question whether the BLM has taken a hard look at the air quality impacts of this leasing decision, and in particular the number of past exceedances. 55

Twenty-seven exceedances of the PM-10 NAAQS is significant evidence that the mines "south and east" of Wright are either failing to ensure compliance with the NAAQS. Despite this, the BLM does not explain in the DEIS how $PM_{10}$ exceedances will be prevented and reduced in the future. Instead, the DEIS at 3-46 simply asserts that, "new air quality modeling would need to be conducted in support of that permit application demonstrating on-going compliance with all applicable ambient standards." This hardly serves to meet BLM's hard look responsibilities under NEPA. Particularly given that the Wyoming Department of Environmental Quality ("WYDEQ") does not actually model PM-10 impacts, and given that WYDEQ only assess the impacts to the NAAQS in the context of individual sources of air pollution, the BLM cannot rely on the WYDEQ to ensure that future NAAQS exceedances will be prevented, or that a violation of the NAAQS will be avoided. 34

What's more, although a formal "nonattainment" designation has not been made by EPA, the BLM has an independent duty under the Federal Land Policy and Management Act

("FLPMA") to assure compliance with federal air quality standards. *See* 43 USC § 1712(c)(8). This requirement applies, whether or not a formal "nonattainment" designation has been made by EPA. 42

**b. It is Unclear how Background PM-10 Was Established and how it was Factored into the BLM's Analysis**

The DEIS asserts that background 24-hour PM-10 concentrations are 54 micrograms/cubic meter in the Powder River Basin. *See* DEIS, Table F-1 at F-4. This background is apparently based on 2002 data gathered from the Eagle Butte Mine in Campbell County, WY. 56

It is unclear how this background level of PM-10 was assessed. For one thing, it is unclear why the BLM utilized 2002 data when more recent monitoring data exists. For another thing, it is unclear why the BLM utilized data from the Eagle Butte Mine and not one of the mines in the Wright LBAs area. Monitoring occurs at the North Antelope-Rochelle, Black Thunder, and Jacobs Ranch Mines. Finally, it is unclear how the BLM assessed background concentrations. Under federal regulations, the PM-10 NAAQS are attained whenever the number of days in a calendar year with a 24-hour concentration of 150 micrograms/cubic meter exceeds one. It is unclear how the assessed background 24-hour PM-10 concentration in the context of the NAAQS.

Adding to this confusion, it is unclear how the BLM factored background PM-10 concentrations into the agency's analysis of PM-10 impacts. While background levels are noted, it does not appear that the DEIS actually assessed any potential PM-10 increases in order to assess whether PM-10 NAAQS will be fully protected.

We strongly urge the BLM to assess PM-10 impacts based on monitoring data from all sites within the Wright Area LBAs. According to the EPA, there are a number of PM-10 monitors at the North Antelope-Rochelle, Black Thunder, and Jacobs Ranch Mines Areas.[29] We request the BLM assess PM-10 impacts at each individual monitoring site to ensure compliance with the NAAQS across the area. 42

**c. The BLM Cannot Rely on the Natural Events Action Plan as Currently Written and Enforced**

The DEIS states on page F-12 that, "based on the EPA's Natural Events Policy, $PM_{10}$ concentrations due to dust raised by unusually high winds will be treated as uncontrollable natural events under the following conditions: (1) the dust originated from non-anthropogenic sources, or ***(2) the dust originated from anthropogenic sources controlled with BACM***" (emphasis added). Part (2) of this policy effectively nullifies the $PM_{10}$ NAAQS because all exceedances will be excused as long as the mine operator is following the BACM. Yet, the state does not monitor BACM on a regular basis, so we have no assurance that operators are actually 57

[29] *See* **Exhibit 8.**

following BACM except for their own self-reporting. Further, the DEIS states at page F-11 that "these measures [BACM] are not current requirements in all of the mines' air quality permits."

Regardless, the DEIS fails to demonstrate how BACM requirements will be continuously met to ensure protection of the PM-10 NAAQS. No information or analysis is provided in the DEIS demonstrating that BACM requirements will be effectively implemented, enforced, and will effectively maintain compliance with the NAAQS.

**d. The DEIS Fails to Provide Information and Analysis Supporting the Effectiveness of any PM-10 BACT Measures**

Also of concern is that the DEIS does not provide information or analysis demonstrating that best available control technology requirements, or BACT, for PM-10 will be effective at protecting the NAAQS. According to the DEIS at page F-7, BACT are included in air pollution permits for all mines in Wyoming. All the mines have coal preparation and processing facilities (*see* DEIS 3-45), so the BACT for these parts of the mines are the requirements in 40 CFR Part 60 Subpart Y. The DEIS admits that the Subpart Y standards "are typically less stringent than state-level BACT limits." DEIS at F-7. If this is true, the DEIS must show how state BACT limits will protect air quality. Specifically, it should explain how 27 or more $PM_{10}$ exceedances—which are an indication that the region is very capable of violating the NAAQS—will not be repeated in the future. Many of the work practices mentioned are voluntary, thus unenforceable, raising concerns that reliance upon these practices cannot serve to ensure an adequately analysis and assessment of impacts. And again, although WYDEQ may be addressing PM-10 impacts to some degree, this does not absolve the BLM of its responsibility under FLPMA ensure that its land management actions do not violate federal clean air standards. At a minimum, the DEIS must provide information and analysis necessary to demonstrate compliance with BLM FLPMA obligations.

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**4. The DEIS Fails to Adequately Analyze and Assess Ozone Impacts**

The DEIS fails to adequately analyze and assess ozone impacts to ensure compliance with the NAAQS.

**a. The BLM is Inappropriately Assessing Impacts to the Ambient Air Quality Standards**

The BLM mistakenly asserting that the new ozone NAAQS of 0.075 ppm is not applied retroactively. *See* DEIS at 3-66—3-67. In other words, the agency is asserting that prior to May 2008, when the new ozone NAAQS was promulgated, impacts and compliance are assessed in the context of the old ozone NAAQS of 0.080 ppm. As a result, BLM does not seem to be addressing exceedances of the current NAAQS that occurred prior to 2008 in the context of analyzing and assessing impacts.

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To begin with, this is not only contrary to how the NAAQS are applied, but troublesome in light of what monitoring data is showing in the Powder River Basin. Since 2001, ozone levels

have exceeded the 0.075 ppm standard on 16 days in Campbell County.[30] Not only that, but the three-year average of the 4th highest annual 8-hour readings, or the design value, at both Campbell County ozone monitors is trending upward. Although the Campbell County ozone monitors obviously have not been operating for very long, a trend seems to be emerging. Notwithstanding this, the BLM asserts that "no exceedances" of the current ozone NAAQS have occurred in the Powder River Basin. *See* DEIS at 3-67.

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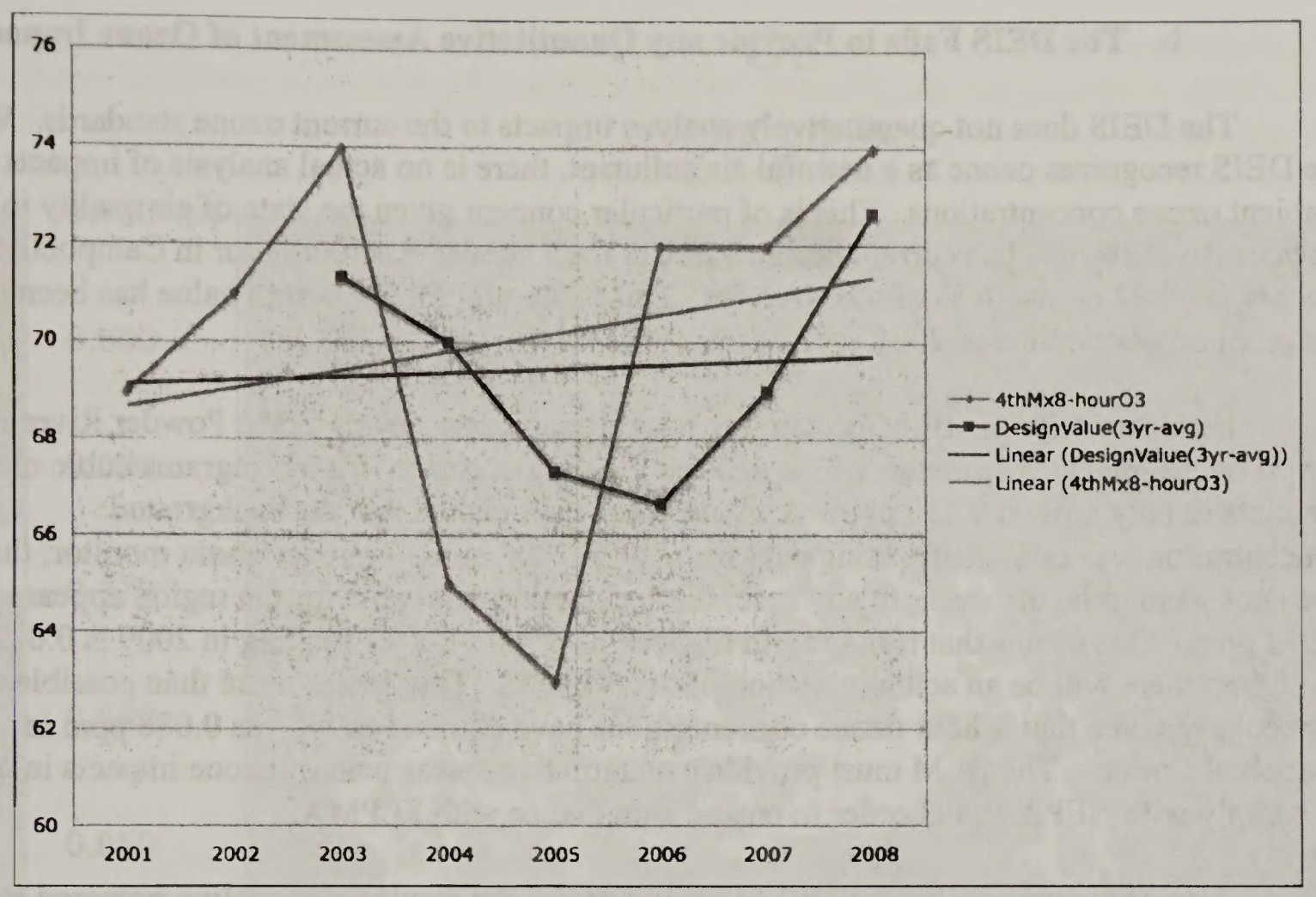
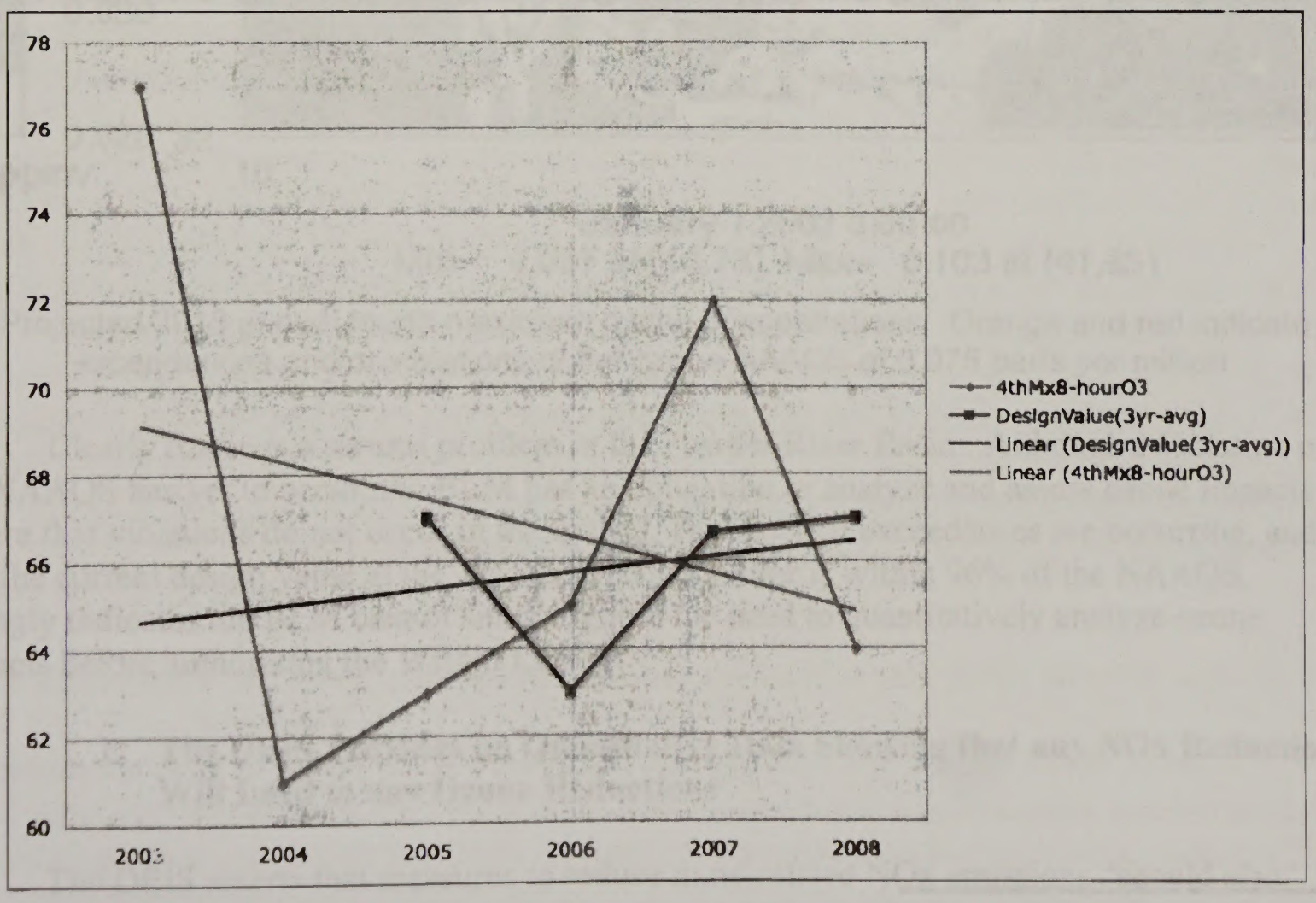
[30] *See* **Exhibit 9.** Contrary to BLM's assertion, an exceedance of the ozone NAAQS occurs anytime 8-hour concentrations exceed 0.075 parts per million. This is why the EPA monitoring data identifies 16 ozone exceedances at the Campbell County ozone monitors since 2001.




**4th Maximum 8-hour Ozone Readings and Ozone Design Values (three year average of 4th max.) from Thunder Basin Ozone Monitor (above) and S. Campbell County Ozone Monitor (below) (data from EPA).**



**b. The DEIS Fails to Provide any Quantitative Assessment of Ozone Impacts**

The DEIS does not quantitatively analyze impacts to the current ozone standards. While the DEIS recognizes ozone as a harmful air pollutant, there is no actual analysis of impacts to ambient ozone concentrations. This is of particular concern given the state of air quality in the Powder River Basin. The current design value at the Thunder Basin monitor in Campbell County is 0.072 ppm—96% of the NAAQS. This is the highest the design value has been since the monitor went online in 2001.

Unfortunately, the BLM is claiming background ozone levels in the Powder River Basin are 70 micrograms/cubic meter, which appears highly inaccurate. 70 micrograms/cubic meter amounts to only around 0.030 ppm. Although the DEIS claims that the background concentration was established using data from 2002-2008 at the Thunder Basin monitor, this does not seem to be the case. In any case, the accurate design value for the region appears to be 0.072 ppm. This means that if the fourth highest maximum 8-hour reading in 2009 is 0.082 ppm or higher, there will be an actual violation of the NAAQS. This seems more than possible, particularly given that 8-hour ozone concentrations have climbed as high as 0.088 ppm in Campbell County. The BLM must provide a quantitative assessment of ozone impacts in order to comply with NEPA and in order to ensure compliance with FLPMA.

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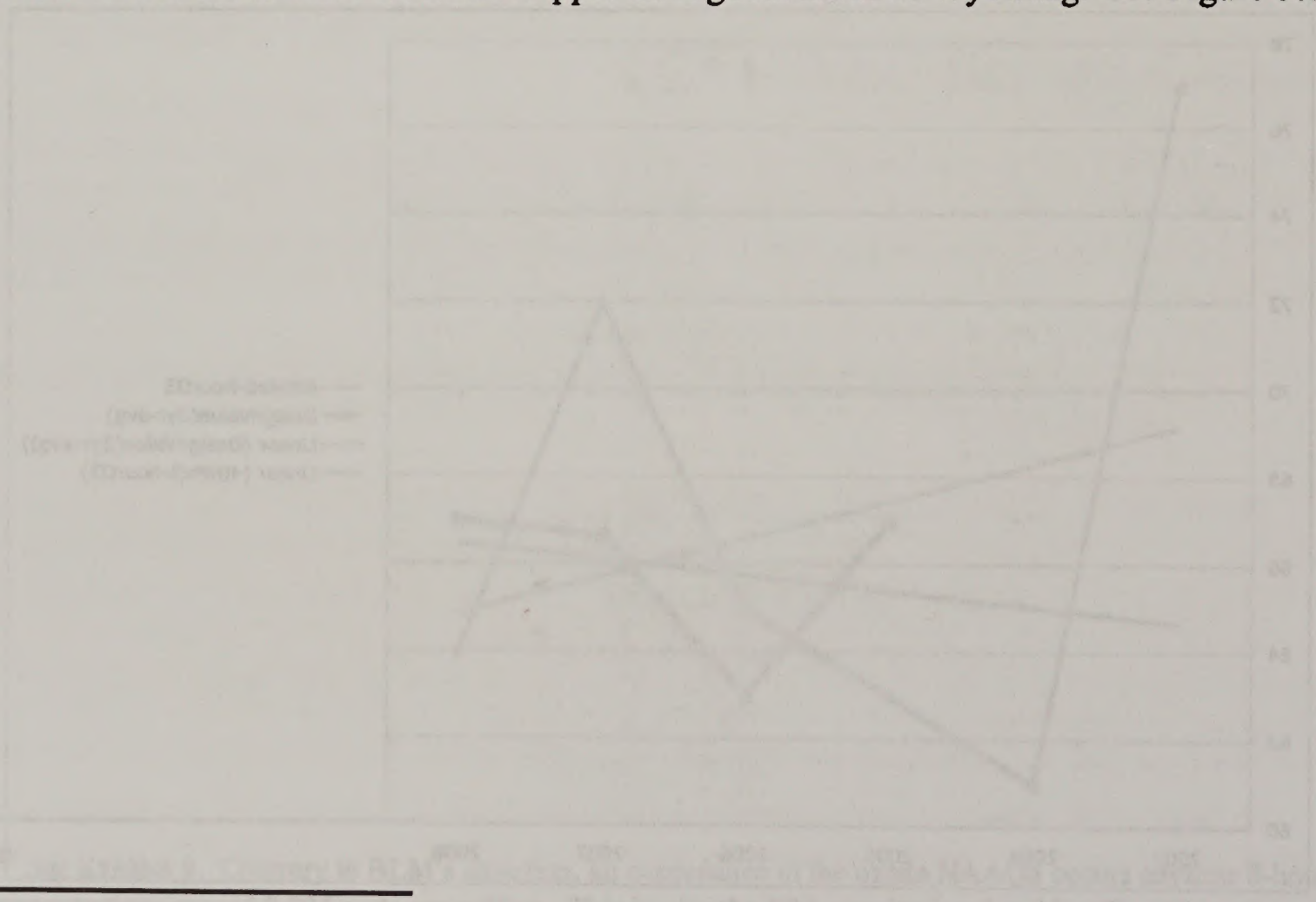
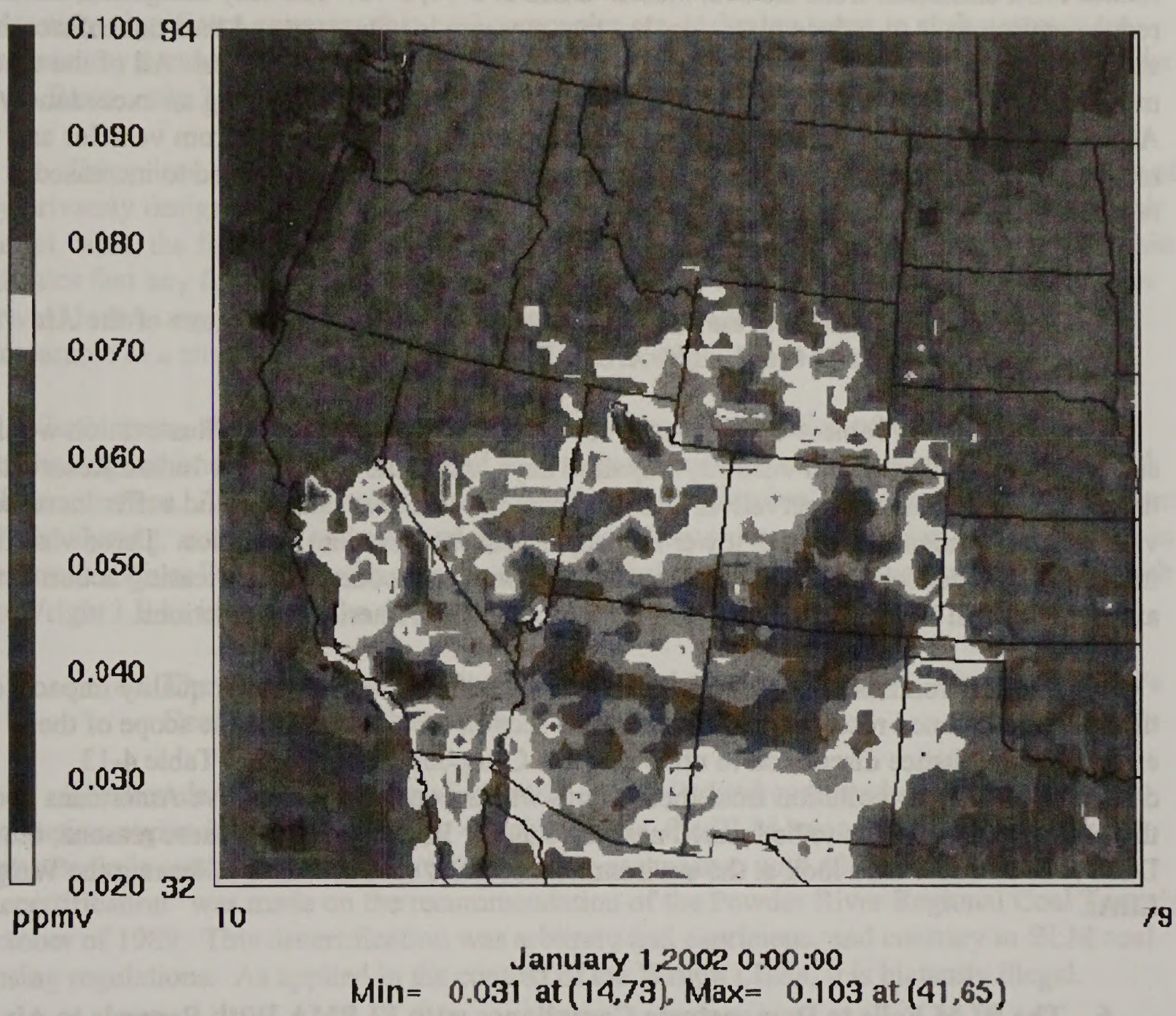
Also of concern is that the DEIS fails to address the results of modeling prepared for the Western Regional Air Partnership, which strongly indicate that attainment and maintenance of the 8-hour ozone NAAQS is at risk throughout the Western States, including in the Powder River Basin of Wyoming.[31] This modeling in fact shows that the annual fourth maximum 8-hour ozone concentration will exceed 0.075 ppm throughout much of Wyoming. *See* Figure below.



[31] ***See* Exhibit 10.**




Projected 2018 annual fourth maximum ozone concentrations. Orange and red indicate exceedances and/or violations of the ozone NAAQS of 0.075 parts per million.

Clearly ozone is a serious problem in the Powder River Basin. Although a violation of the NAAQS has yet to occur, the BLM has an obligation to analyze and assess ozone impacts to ensure that violations do not occur in the future. The fact that exceedances are occurring, and that the current design value at the Thunder Basin monitor is within 96% of the NAAQS, strongly indicates the BLM cannot simply ignore the need to quantitatively analyze ozone impacts before authorizing the Wright LBAs. 3

**c. The DEIS Provides no Quantitative Data Showing that any NOx Reductions Will Lead to any Ozone Reductions**

The DEIS asserts that measures to reduce mine-related NOx emissions "should also" reduce the potential for the formation of ground level O3 in the PRB." DEIS at 3-75. There is 32

no quantitative support for this statement. What's more, even on a qualitative level, this statement is misleading and in accurate. The direct $NO_X$ mitigation measures in Section 3.4.3.3 are designed primarily designed to keep the public away from clouds of $NO_2$, not as a means to reduce NOx emissions from the coal mines. DEIS at 3-74, 3-75. The only mitigation that might reduce emissions is to reduce blast size, but that measure is voluntary and thus not enforceable and cannot be relied upon to demonstrate any NOx reductions will occur. *Id.* All of the other measures listed are voluntary, thus not enforceable even if a mine is causing an exceedance. Also, the DEIS does not mention any measures to reduce $NO_X$ emissions from vehicles and machinery on the mines. All of these $NO_X$ sources have the potential to lead to increased regional ozone concentrations.

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**5. The DEIS Fails to Address the Environmental Justice Implications of the Air Quality Impacts of the Wright Area LBAs**

According to Table 4-13 on page 4-45, the North Cheyenne Indian Reservation would suffer the largest increase in visibility-impaired days, while the Wind River Indian Reservation, the Fort Belknap Indian Reservation, and the Crow Indian Reservation would suffer increases in visibility impairment under both lower and upper coal development scenarios. These visibility impacts raise a concern about the environmental justice component of this leasing action because air pollution will have a particularly bad impact on Native American populations.

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The Environmental Justice Section at 3.17.7 fails to mention the air quality impacts on the above-mentioned reservations. Further, this section arbitrarily limits the scope of the environmental justice discussion to effects within Campbell County only. Table 4-13 demonstrates that air pollution from these mines will unequally affect Native Americans because their reservations happen to be located near the Powder River Basin. For these reasons, the DEIS fails to take a hard look at the environmental justice consequences of leasing the Wright LBAs.

**6. The BLM Fails to Demonstrate Compliance with FLPMA With Regards to Air Quality Impacts**

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As explained, the BLM has a duty to ensure compliance with the NAAQS in accordance with FLPMA. *See* 43 USC § 1712(c)(8). The DEIS unfortunately fails to demonstrate that the PM-10 and ozone NAAQS in particular will be protected as a result of the Wright LBAs, thereby indicating that the BLM may not meet its responsibilities under FLPMA.

**7. The Powder River Basin Was Erroneously Decertified as a Coal Production Region**

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The BLM has erroneously "decertified" the Powder River Basin as a coal production Because of this, coal leasing is done based on an application filed by a private company. The LBA process allows private coal company, and not the federal government, to design the tract of land subject to leasing. Because the Powder River Basin remains a decertified coal production

region, leasing is done on an application filed by a private company. The LBA process allows private coal company, and not the federal government, to design the tract of land subject to leasing. In the Powder River Basin this has allowed each major coal producer in the area to submit applications for lease federal coal leases in areas and on tracts that they have designed. This raises significant concerns that coal companies are designing tracts in such a way as to preclude any meaningful competition. Indeed, in the last 20 years of coal leasing in the Powder River Basin, only 3 out of 21 leases have received more than one bid.

This raises concerns that the Federal government is failing to ensure fair market value of any privately designed and nominated lease tracts. Notwithstanding BLM's duty to ensure fair market value, the fact that so little competition occurs for coal leases in the Powder River Basin indicates that any fair market value assessment is skewed. Indeed, with no actual competition for coal leases, any fair market value price could not possibly be based on an appraisal comparable to a situation where actual competition occurs.

What's more, the "decertification" and the LBA process has allowed the BLM to avoid establishing regional leasing levels based on a regional analysis of environmental impacts and public comment. As will be explained further, the "decertification" is preventing the BLM from fully analyzing, assessing, and addressing the regional environmental impacts of coal leasing in the Powder River Basin. For the reasons explained below, the BLM cannot move forward with the Wright LBAs in light of the decertification.

**a. The Decertification was Arbitrary and Capricious and Contrary to BLM's Coal Leasing Regulations**

The Powder River Basin was "decertified" as a Federal coal production region coal production region in January of 1990. In other words, the BLM has asserted that the Powder River Basin is outside a coal production region in accordance with 43 CFR § 3400.5. This "decertification" was made on the recommendation of the Powder River Regional Coal Team in October of 1989. This decertification was arbitrary and capricious, and contrary to BLM coal leasing regulations. As applied in the context of the Wright LBAs, it is blatantly illegal.

Although there is no definition of "coal production region" in BLM's regulations, the common sense meaning of the word is that it refers to a region where coal is produced. This is exactly why the Powder River Basin was originally designated a "coal production region" in accordance with 43 CFR § 3400.5. Such a designation made sense, even in 1989. Indeed, even in 1989, the Powder River Basin produced nearly 15% of all coal produced in the United States. *See* chart below.[32] This hardly seems indicative of a region that was not producing coal, or that otherwise had no interest from the coal industry.

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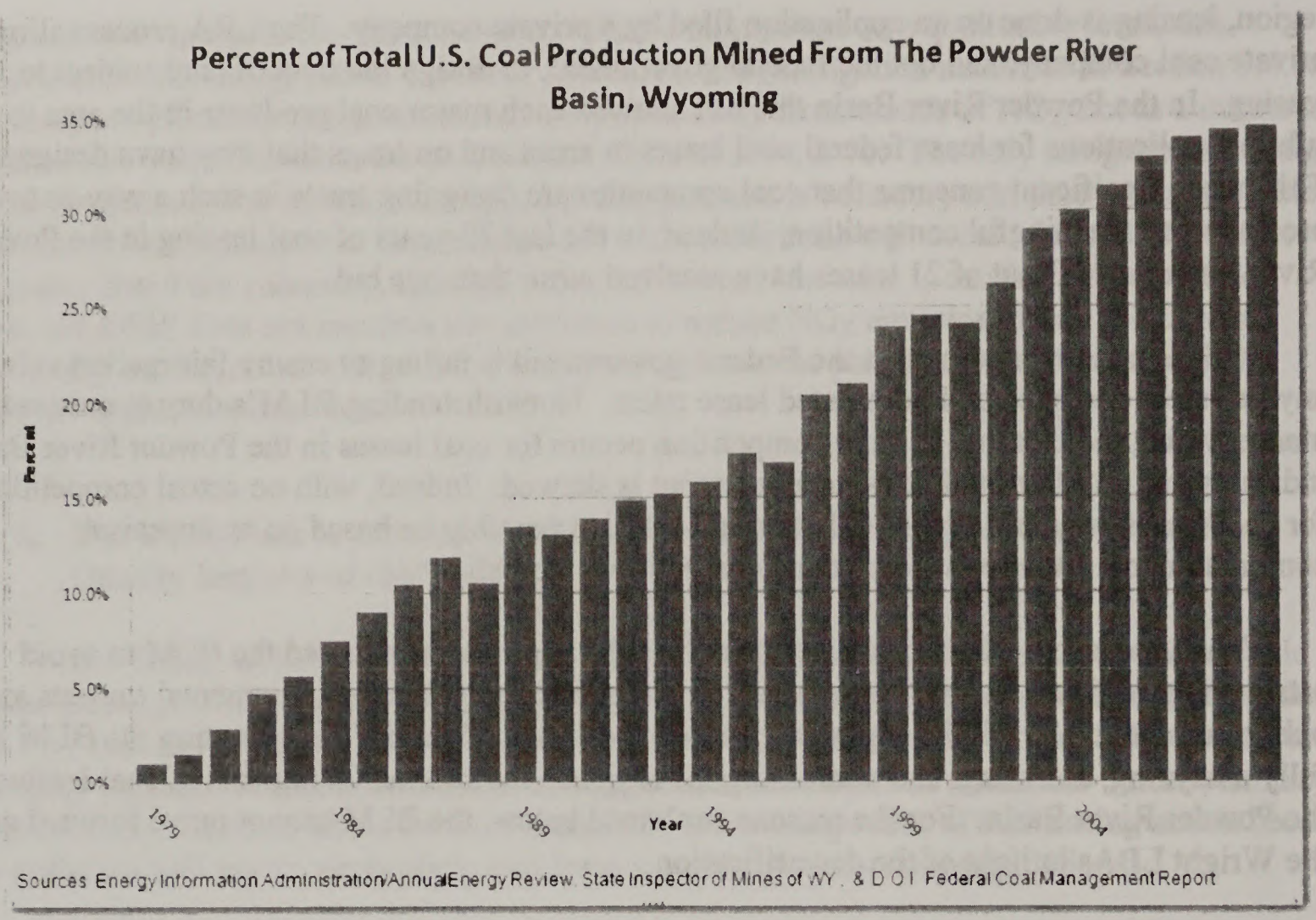
[32] This chart is available at www.blm.gov/pgdata/etc/medialib/blm/wy/programs/energy/coal/prb.Par.5321.Image.-1.-1.1.gif.




The BLM has responded that decertification was needed to spur interest in coal leasing in the Powder River Basin. This is not supported by the record of that decision. In response to a March 2009 Freedom of Information Act request submitted to both the Montana and Wyoming BLM offices by WildEarth Guardians seeking all records supporting the 1989 decision by the Regional Coal Team to decertify the Powder River Basin, we received no records indicating that coal leasing interest had been waning, that decertification would actually lead to increased leasing interest, or any other information suggesting that the Powder River Basin was not a coal production region.[33] What seems apparent is that the Powder River Regional Coal Team appeared to move to "decertify" the Powder River Coal Production Region so as to be able to utilize the LBA process. This is clearly an arbitrary and capricious reason to "decertify" the Powder River Basin as a coal production region.

Furthermore, although BLM may have discretion to "change" a coal production region or alter boundaries, the regulations are clear that coal production regions are to be used to identify, rank, analyze, select, and schedule lease tracts (i.e., activity planning) in accordance with 43 CFR § 3420.3-1. Logically, the only time the BLM would be allowed to "decertify" a coal production region is if activity planning was inappropriate, such as in areas that were determined to be unacceptable for further consideration for leasing through any land use planning prepared consistent with 43 CFR § 3420.1-4.

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[33] Thus far we have only received records from the Montana State Office. However, the Montana FOIA Officer indicated that responsive records received by WildEarth Guardians from Montana would be largely the same as the responsive records from Wyoming.

Did the BLM make a determination that the entire Powder River Basin was unacceptable for further consideration for leasing through any land use planning prepared consistent with 43 CFR § 3420.1-4? The answer, based on data received through FOIA, appears to be no.

**b. Even if the Decertification was Appropriate in 1989, it is Now Inappropriate in Light of Current Production and Leasing Levels in the Powder River Basin** 28

Although it is seriously questionable whether the "decertification" of the Powder River Basin as a coal production region was appropriate in 1990, it is clear that it is inappropriate today. Indeed, coal production in the Powder River Basin region is significant and has increased substantially over the years. According to data from the BLM's own website, coal production just in the Wyoming portion of the Powder River Basin has increased from 293 million tons to more than 446 tons in 2008.[34] The region is currently producing record amounts of coal.

Furthermore, the Powder River Basin region produces more coal than any other region in the United States. Currently, the Powder River Basin provides 42% of the nation's coal, a figure that has grown substantially over the years. According to the Energy Information Administration, the Powder River Basin currently produces more coal than all the coal mines combined east of the Mississippi River. Indeed, in 2007, the entire Powder River Basin produced more than 479,000 tons of coal while mines east of the Mississippi produced 477,006.[35] This is a significant amount of coal to be produced from a single region.

Additionally, leasing interest has been very high in the Powder River Basin. Since 1990, 21 coal leases have been offered amounting to more than 5.8 billion tons of coal. Not only that, but the BLM has 12 coal leases pending—including the six leases that are part of the Wright LBAs—that collectively have the potential to lead to the leasing of an additional 5.8 billion tons of coal.[36]

What's more, in light of the fact that "decertification" has apparently spurred additional leasing interest in the Powder River Basin (as evidenced by the Wright LBAs), why hasn't the BLM taken steps to "recertify" the Powder River Basin. If "decertification" is warranted in light of low interest in leasing, then certainly "recertification" clearly is warranted in light of the current high interest in leasing. Clearly the Powder River Basin is a coal production region and must be recertified as such in light of current leasing and production levels.

**c. The Decertification Means the BLM has Failed to Appropriately Assess Environmental Impacts and Appropriately Involve the Public in Regional Leasing** 28

Although the decertification of the Powder River Basin as a coal production region raises well-founded concerns that the BLM is unable to ensure fair market value through the LBA

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[34] *See* **Exhibit 11**.

[35] *See* http://www.eia.doe.gov/cneaf/coal/page/acr/table1.html.

[36] Based on the high development scenario alternatives for the Hay Creek II, South Gillette, West Antelope II, and Wright LBAs.

process, we are most concerned with the fact that the decertification has prevented the BLM from appropriately analyzing and assessing the environmental impacts of leasing, from setting appropriate leasing, or activity, levels, and from appropriately involving the public in regional coal leasing decision.

Indeed, BLM's coal leasing regulations prescribe a number of requirements and procedures that are normally followed when leasing occurs in a "coal production region." For instance, 43 CFR § 4320.2 requires, among other things, that regional leasing levels be established, that a regional leasing environmental impact statement be prepared, and that the Secretary of the Interior take into account the environmental effects when setting regional leasing levels. Further, activity planning at 43 CFR § 3420.3-1 requires that alternative leasing levels be analyzed in the regional leasing EIS, and that the tract ranking process at 43 CFR § 3420.3-4(a)(1) also requires consideration of environmental effects when the regional coal team sets tract rankings. The regulation states, "Three major categories of consideration shall be used in tract ranking: coal economics; impacts on the natural environment; and socioeconomic impacts." If the Powder River Basin was a coal production region, the BLM would be required to prepare a regional lease sale EIS "on all tract combinations selected by the regional coal team for the various leasing levels" and consider "[t]he site-specific potential environmental impacts of each tract being considered for lease sale" and "[t]he intraregional cumulative environmental impacts of the proposed leasing action and alternatives, and other coal and noncoal development activities." 43 CFR § 3420.3-4(c).

In other words, if the Powder River Basin was a coal production region, the BLM would not only be required to set regional leasing levels based on consideration of environmental impacts, but would prepare a much more comprehensive EIS addressing the impacts of all lease tracts, both individually and cumulatively, before moving to lease coal in the Powder River Basin. 44

Not only would environmental impacts be appropriately considered, but the public would have numerous opportunities to submit input not only on regional coal leasing levels, but on the regional leasing EIS as well. *See* 43 CFR §§ 3420.2 and 3420.3-4. The regulations give the public an opportunity to consider the environmental effects of regional leasing levels and of tract selections for leasing. By "decertifying" the Powder River Basin as a coal production region, the BLM has shut the door on the ability of the public to influence regional leasing levels and the selection of regional tracts for leasing. Currently, the public is simply forced to respond to LBAs proffered by coal companies. 28

The inability of the BLM to fully address the environmental impacts of regional coal leasing in the Powder River Basin and to fully involve the public in accordance with the competitive leasing requirements of 43 CFR § 4320, is especially problematic in light of the global warming impacts of coal leasing in the Powder River Basin. Put simply, the BLM has failed to establish regional leasing levels accordingly based on consideration of global warming impacts and failed to address the regional global warming impacts of coal leasing in the Powder River Basin. The agency has also denied the public the ability to influence regional leasing levels based on their concerns over global warming. 5

**d. The DEIS Cannot Serve as Functional Equivalent to a Regional Leasing EIS, Which Would Otherwise be Required**

Although the BLM may claim that the Wright LBAs DEIS fulfills the agency's duties to consider regional leasing impacts and involve the public, this is not the case. Particularly in the context of global warming and GHG emissions, there is no possible way that the DEIS could serve as a functional equivalent. 6

While the DEIS presents some regional data regarding $CO_2$ emissions for the Powder River basin region, the public does not have an opportunity to comment on these regional impacts because the DEIS only deals with the question of leasing the Wright LBAs. Thus, this DEIS cannot be a "functional equivalent" of a regional EIS because the action considered, as well as the alternatives considered, are limited in size and scope to the Wright LBAs.

Moreover, the BLM emphasizes the limited scope of this NEPA analysis by asserting that the No Action Alternative would not result in fewer $CO_2$ emissions because other coal mines would supply just as much coal to the national market. Although this claim is spurious, to say the least, under a regional leasing level EIS, this would certainly not be true because the Powder River Basin is the United States' largest sources of coal. A decision not to lease any coal in the Basin would significantly impact the nation's coal supply and national $CO_2$ emissions. Under a regional EIS, the public would be able to comment on a No Action Alternative or various other action alternatives that could better address the need to reduce national $CO_2$ emissions in order to mitigate the impacts of global warming. Here, in contrast, the public may only submit comments on Alternatives that the BLM asserts will not impact climate change anyway. Thus, the LBA process does not provide the public with an opportunity to consider and comment upon the significant environmental effects caused by the tremendous amount of $CO_2$ emissions release by coal from the PRB region. 45

Regardless, the BLM cannot claim that the Wright LBAs DEIS fulfills the requirements of a regional leasing EIS, yet fail to adhere to other procedures under 40 CFR § 3420 regarding the establishment of regional leasing levels and activity planning, among other requirements. 28

**e. The Powder River Regional Coal Team is Illegally Operating**

We finally want to raise the concern that the Powder River Regional Coal Team appears to be operating illegally. Under BLM regulation, Regional Coal Teams are established only for coal production regions. *See* 43 CFR § 3400.4(a). Because the Powder River Basin has been "decertified" as a coal production region, the Regional Coal Team is not legally allowed to exist or function in any of the capacities set forth under BLM's coal leasing regulations at 43 CFR §§ 3400 and 3420. 28

**8. Even if the Decertification of the Powder River Basin Remains Appropriate, the BLM Must Still Assess Whether the Wright LBAs Would be Contrary to the Public Interest** 14

Under the LBA regulations, the BLM must reject any application that, on the basis of environmental or other sufficient reasons, would be contrary to the public interest. *See* 43 CFR § 3425.1-8. In this case, even if the BLM determines that the "decertification" of the Powder River Basin was appropriate, the agency must still provide a full and thorough assessment as to whether the Wright LBAs are contrary to the public interest. 28

In this case, given the global warming impacts of the Wright LBAs, it appears apparent that it would be contrary to the public interest to approve the LBAs. It is undisputed that anthropogenically generated carbon dioxide and other greenhouse gases present a substantial endangerment to the health of persons and the environment and that denial of the Wright LBAs is necessary to protect the long-term health of the public, the environment, and the economy. As already discussed, and as the BLM has already disclosed, coal from the Wright LBAs will be burned, generating massive amounts of carbon dioxide, fueling global warming.

Climate change is the most-serious threat to public health and the environment facing the world today. The evidence is that climate change, including dangerous increases in temperature, primarily attributable to human emissions of carbon dioxide and other greenhouse gasses is occurring now, and has already caused harm to the health of persons and the environment. Unless effective measures to address climate change and its consequences are implemented in the immediate future, harm to human health and the environment of unprecedented severity and scope, including additional loss of human life and collapse of entire ecosystems may result. The need to act urgently to reverse global warming is especially apparent in light of recent findings by scientists indicating that "the pace of global warming is likely to be much faster than recent predictions, because industrial greenhouse gas emissions have increased more quickly than expected and higher temperatures are triggering self-reinforcing feedback mechanisms in global ecosystems[.]"[37]

WildEarth Guardians has submitted numerous pieces of scientific information and comments disclosing and discussing the effects of global warming and the need for the BLM to urgently address the problem. The BLM has similarly disclosed in the DEIS scientific information and analysis documenting the contribution of coal mining in the Powder River Basin and subsequent coal burning to greenhouse gas emissions and global warming. In light of the clear link between anthropogenic greenhouse gas emissions and global warming, as well as the massive impact Powder River Basin coal has on overall greenhouse gas emissions within the United States, the BLM has clear reason to reject the Wright LBAs pursuant to 43 CFR § 3425.1-8. 5

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[37] *See* **Exhibit 12**.

Thank you for the opportunity to comment.

Sincerely,

Jeremy Nichols
Climate and Energy Program Director
WildEarth Guardians
1536 Wynkoop, Suite 301
Denver, CO 80202
(303) 573-4898 x 1303
jnichols@wildearthguardians.org

# Clean Energy Consulting, LLC

4492 Burr Place, Boulder, CO 80303  303-245-8637


Bureau of Land Management
2987 Prospector Drive
Casper, Wyoming 82604

August 25, 2009

RE: The Wright Area Lease Applications Draft Environmental Impact Statement

Dear Ms. Bucklin,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement for the Wright Area Coal Lease Applications.

As always I appreciate the tremendous amount of work that goes into the Draft Environmental Impact Statements, but until formatting is changed as discussed below, the DEIS is so dense as to be almost useless to the public. Until this is changed, then the BLM is not meeting the goal of informing the public of the environmental impacts of the proposed leasing. While the impacts may be buried in the endless pages of text, they are not easily understood or reviewed by either the public or the decision maker and so the goal of the National Environmental Policy Act has not been achieved.

**Do Not Proceed with the Lease by Application Process**

28

The use of the "Lease by Application" ("LBA") process in 43 CFR 3425 was designed for unique situations involving mines outside of coal producing areas. Clearly the Powder River Basin is a very large coal producing area and the procedures of the "Lease by Application" process are inadequate and inappropriate. Reject the six "LBA" applications and use the appropriate full-fledged competitive leasing procedures spelled out in 43 CFR §§ 3420-3422.

All other comments are subsidiary to this one The entire DEIS needs to be withdrawn until the BLM has redesignated the Powder River Basin as a coal producing area and has complied fully with 43 CFR 3400 and other applicable laws and regulations. It is absurd to proceed as though the Powder River Basin is not a coal producing region when it is the largest coal producing region in the United States and perhaps in the world.

**Please Provide an Additional 60 Days for the Comment Period**

Given the fact that there are 6 different tracts being analyzed and the dense nature of the DEIS, please extend the public comment period by 60 days to October 25 2009. BLM has chosen to include six different tracts in this DEIS and it has led to a very lengthy, dense and confusing DEIS. In order to provide time for a proper public evaluation, please extend the deadline past the suggested 45 days by 15 days for each additional tract. This would lead to 45 + [(5) x (15)] = 120 days for review—or 60 days beyond the August 25, 2009 deadline. 45

**Readability and Accesibility**

To improve readability and accessibility of these very dense statements, essentially every page should have a subheading and each section should be introduced by a summary in bold to allow the reader to skim the report and assess the magnitude of the key environmental impacts. Additional tables and figures should be added. To illustrate, here are suggested formatting improvements for part of the Executive Summary. Similar improvements should be made throughout the entire document. 29

1) Begin the Executive Summary with a clear list of all significant environmental impacts so that the busy reader can know by the end of the first page what it is the BLM has learned. Citizens and taxpayers have a right to know what it is their government has learned and this should be readily accessible.

2) Create a table summarizing the information on the various lease applications (ES-1 and ES-6) so that the information on the applicant, the operator the proposed lease and the general characteristics of the lease area are readily accessible in table format.

3) Provide the cites to the Federal Register notices of the activities of the Powder River Regional Coal Team (ES-6)and indicate where on the internet the public can read the charter and the minutes of the PRRCT.

4) For the information on pages ES11-14, please title it something like "Road and Railway Right of Way Impacts on Coal Accessibility," and then provide a summary in bold type of the section and summarize the issues related to roads and railway right of ways for each lease area in a table.

5) Present the basic background information on unsuitability determinations and decisions about moving roads and including roads in the lease analysis areas once. Presently the basic information is repeated over and over and this slows the reader down.

6) Provide a sub-heading for each lease tract and then summarize the information unique to that tract.

6) For Footnotes 5 and 6 in Tables ES-1 through ES-12, please provide the information in a separate table with appropriate references so that it is easy to see the sources of the state and federal revenues. Please also indicate the reason to use $11.06 per ton as the average sales price for the coal.

7) Page ES-27, please note that by assuming that a certain company would be the successful bidder in a lease sale, the BLM is failing to recognize the potential benefits of lease sales designed by the BLM as provided for in 43 CFR 3420-3422.

8) For pages ES-28 through ES-60, first provide a one page summary of the significant environmental impacts using a bulleted list with a highlighted and underlined title for each bullet so that the reader can easily skim the list which might look something like:

- **Topography**
- **Geology**
- **Other Mineral Resources**
- **Paleontology**
- **Air Quality**
- **Groundwater**
- **Surface Water**
- **Alluvial Valley Floors**
- **Wetlands**
- **Soils**
- **Vegetation**
- **Wildlife (With several subheadings)**
- **Threatened and Endangered Species**
- **Land Use and Recreation**
- **Cultural Resources**
- **Visual Resources**
- **Noise**
- **Transportation**
- **Socioeconomics**
- **Environmental Justice**
- **Mitigation**
- **Cumulative Impacts**

The significant impacts in each of these areas should be summarized in a few succinct sentences and then discussed in further detail under each subsection of the same name—and each subsection should begin with a summary in bold. Irretrievable loss of resources (including the loss of relatively accessible coal resources) and cumulative impacts should also be highlighted.

9) Similar formatting and bold summaries should be included throughout the EIS. There should seldom be a page without a subtitle and bold summaries should appear every few pages to break up the stultifying monotony of the text of the present document.

10) Make the total amount of coal being discussed clear throughout the document. The total quantity (e.g. 2.4 to 3.9 billion tons) is not presently easy to find (See page 3-308).

**Suspend the EIS Process Until the PRB Coal Review is Completed** 27

Assessing cumlative impacts is critical and this cannot be done adequately until the PRB Coal Review (see e.g. ES-56) is completed. The EIS process should be suspended until the PRB Coal Review is completed and submitted for public review and comment. 44

**Conduct More Surveys for the Ute Ladies Trusses and Finish USFWS Consultation Before Proceeding** 24

The number of surveys for Ute Ladies' Tresses needs to be increased and all consultation with the USFWS needs to be completed before moving forward with the EIS process. Ute Ladies' Tresses are known to lie dormant for several years so there should be several surveys a year for several years in a row (e.g. 4 surveys per year times 5 years) before proceeding with the EIS process.

**Highlight Visibility Impacts**

There are already serious impacts on visibility in Class I areas as shown in Table ES-14, yet the significance of this data do not appear to be discussed in the Executive Summary; they are just mentioned on page ES-57. Table ES-14 should be cross referenced with the discussion of visibility on pages 3-78 to 3-82 and vice versa.The Badlands National Park violated the 10% impairment standard 218 days of the year or 60 % of the time. (218/365 x 100 = 60%) This is very significant impact on our nation's Class I lands. The federal government is supposed to be remedying existing impairments and preventing future ones rather than obscuring the issue. The graphs on page 3-80 are not informative as to the goals of the Clean Air Act. They only show how badly the standards are being violated over time. **They do not show that existing impairments are being remedied, as called for in the Clean Air Act.** While a statistical improvement is claimed for some of the data, it is modest at best. The data in the graphs on page 3-80 is a little like saying "Gee Officer—this week I was only going 55 in a 30 mile per hour zone and last week I was going 60 so shouldn't you let me off because I'm improving??" Clearly, the goal is not just to reduce how badly the standards are being violated, but to eliminate the violations. Also these graphs should be updated to include 2006 and 2007 data before making a decision about leasing more federal coal in the Powder River Basin. Also, high winds are a natural part of the Wyoming environment so violations of PM10 standards should not be excused under the "NEAP" process (e.g. ES-35). 39 3 34

**Provide Updated Statistics on Mine Reclamation Before Continuing the Analysis** 9

The status of each mine's reclamation status should be updated and clearly highlighted before continuing with the analysis. Also, the fraction of acres that will never be reclaimed should be clearly stated. This data needs to be provided on a mine-specific basis, not on an aggregated basis for the region. Assuming that the mine lands will be reclaimed when reclamation efforts are lagging way behind mining disturbance is inadequate analysis. This information should be provided in the DEIS—not just referred to as being available from the Wyoming Department of Environmental Quality

**Update the Science on Climate Change and Ocean Acidification** 6

The discussion of greenhouse gas emissions needs to be updated and expanded. Key scientific studies will be forwarded in separate e-mails. These should each be summarized in the DEIS and the citation included in the bibliography. Be sure to include impacts on species loss as a result of climate change. The impacts of mining coal and oxidizing it to CO2 are global and the EIS needs to clearly analyze these probable impacts. The unreferenced statement on page 4-112 regarding solar variability should be eliminated or replaced with the assessment of the role of solar variability given by the Intergovernmental Panel on Climate Change. 13 18

**Include the Impacts of Climate Change, Mercury Emissions, Coal Ash in the Executive Summary**

The Executive Summary should include a detailed discussion of the impacts of climate change and the emissions of mercury and other toxic substances from the burning of coal. These are discussed on pages 4-108 to 4-129 in the DEIS but are not discussed in any detail (if at all) in the Executive Summary. 30

**Clarify and Update the Discussion of Alternatives** 2

The DEIS assumes that because a large amount of US electrical generation comes from coal presently that that is the way it will always be. What if buggy whip makers and slide rule and typewriter companies and rotary land line phone companieshad been allowed to make the same assumptions? Clearly that is not how we make progress. We have numerous ways of making electricity and holding our country tied to this 19th century technology does untold damage to our planet—and to our economy. Coal is not cheap. It is not abundant and it is becoming increasingly unreliable as the easily accessed coal deposits are taken from the ground and turned into CO2. All of this needs to be discussed clearly in the DEIS. It is not BLM's job to act as an apologist for the coal industry—but to discuss and protect the public health and welfare. 14

**Appendix B—Unsuitability Criteria**

1) Please add the legal citation for the source of each suitability criteria . 31

2) Please cross-reference the Findings in Appendix B with the pertinent parts of the EIS.

3) For Bald and Golden Eagle nests please identify the number of nests in the analysis area (not just the Lease By Application area and identify the distance from any existing or former nest to both the Lease Area and the disturbed area. 46

4) Complete ALL consultation with the United States Fish and Wildlife Service **before** issuing the Final EIS and include the results of the consultation in the FEIS so that the public can review it. 13

Thank you for this opportunity to comment.

Leslie Glustrom, Principal
Clean Energy Consulting
4492 Burr Place
Boulder, CO 80303

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS Comments--#2--Letter with Overall Comments
Date: 04:31:56 PM Yesterday

Attached please find some comments on the Wright Area Draft EIS on Coal Lease Applications.

Thank you for all your work on this document. Additional documentation will follow in subsequent e-mails.

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #3--Irretrievable Loss of Coal USGS 2008-1202
Date: 04:35:45 PM Yesterday

Hi Sarah--The Wright Area EIS must consider USGS 2008-1202 (Abstract and Link Below).

Most of the coal in the Powder River Basin is buried too deep to be economically recoverable. Before leasing 2-3 billion tons of federally owned coal, the BLM must clearly discuss the irretrievable loss of this very valuable national resource and discuss (in detail) all the alternatives to burning coal to produce electricity in power plants that are less than 40% efficient. This is what the NEPA act is for--to make sure that we don't do something massively stupid--like burning all the coal in inefficient power plants before we've built the solar, wind, geothermal, smart-grid and transmission infrastructure that will power our country in the 21st century. 14 2

The Easter Islanders are said to have cut down all the trees before they built the boats to get off the Island--As wild as it sounds, we also risk doing something that remarkably stupid if we don't soon pay attention to the very real geologic and economic constraints facing our country's coal supplies.

All of this should be thoroughly discussed and **highlighted** before moving forward with the leasing of federally owned coal.

# Assessment of Coal Geology, Resources, and Reserves in the Gillette Coalfield, Powder River Basin, Wyoming

By James A. Luppens, David C. Scott, Jon E. Haacke, Lee M. Osmonson, Timothy J. Rohrbacher, and Margaret S. Ellis

## ABSTRACT

The Gillette coalfield, within the Powder River Basin in east-central Wyoming, is the most prolific coalfield in the United States. In 2006, production from the coalfield totaled over 431 million short tons of coal, which represented over 37 percent of the Nation's total yearly production. The Anderson and Canyon coal beds in the Gillette coalfield contain some of the largest deposits of low-sulfur subbituminous coal in the world. By utilizing the abundance of new data from recent coalbed methane development in the Powder River Basin, this study represents the most comprehensive evaluation of coal resources and reserves in the Gillette coalfield to date. Eleven coal beds were evaluated to determine the in-place coal resources. Six of the eleven coal beds were evaluated for reserve potential given current technology, economic factors, and restrictions to mining. These restrictions included the presence of railroads, a Federal interstate highway, cities, a gas plant, and alluvial valley floors. Other restrictions, such as thickness of overburden, thickness of coal beds, and areas of burned coal were also considered.

The total original coal resource in the Gillette coalfield for all eleven coal beds assessed, and no restrictions applied, was calculated to be 201 billion short tons. Available coal resources, which are part of the original coal resource that is accessible for potential mine development after subtracting all restrictions, are about 164 billion short tons (81 percent of the original coal resource).

Recoverable coal, which is the portion of available coal remaining after subtracting mining and processing losses, was determined for a stripping ratio of 10:1 or less. After mining and processing losses were subtracted, a total of 77 billion short tons of coal were calculated (48 percent of the original coal resource).

Coal reserves are the portion of the recoverable coal that can be mined, processed, and marketed at a profit at the time of the economic evaluation. With a discounted cash flow at 8 percent rate of return, the coal reserves estimate for the Gillette coalfield is10.1 billion short tons of coal (6 percent of the original resource total) for the 6 coal beds evaluated.

## Available Products

Download OFR 2008-1202 (92.3 MB) <http://pubs.usgs.gov/of/2008/1202/pdf/ofr2008-1202.pdf>

This report is available online in Portable Document Format (PDF). If you do not have the Adobe Acrobat PDF Reader <http://www.adobe.com/products/acrobat/readstep.html> , it is available for free download from Adobe Systems Incorporated.

**Document Accessibility:** Adobe Systems Incorporated has information about PDFs and the visually impaired. This information provides tools to help make PDF files accessible. These tools and the accessible reader may be obtained free from Adobe at **Adobe Access** <http://access.adobe.com/> .

**The citation for this report, in USGS format, is as follows:**

*Luppens, J. A., Scott, D. C., Haacke, J. E., Osmonson, L. M., Rohrbacher, T. J., and Ellis, M. S., 2008, Assessment of Coal Geology, Resources, and Reserves in the Gillette Coalfield, Powder River Basin, Wyoming: U.S. Geological Survey Open-File Report 2008-1202, 127 p.*

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area Coal Lease DEIS #4 Carbon Dioxide Persistence Articles
Date: 04:38:38 PM Yesterday

Hi Sarah—These are comments for the Wright Area DEIS.

It is critical to realize that once coal (highly reduced carbon) is taken out of the ground and oxidized into CO2 we've made a molecule that will be us for hundreds and thousands of years--trapping heat, warming the planet, contributing to extreme weather events and species extinction for such a long time that it might as well be considered "forever." In the process we will be irretrievably losing some of the assimilative capacity of the oceans and the atmosphere. These articles need to be cited, summarized in the EIS and the consequences **clearly highlighted** in both the Executive Summary and in the body of the EIS. 6

Carbon Dioxide stays in the atmosphere for a really long time. The attached pdfs talk about approx 25% staying for over a thousand years.

-Archer Journal of Geophys Research 110, C09S05 (2005)

- Montenegro Geo Physical Research Letters 34, L19707 (2007)

These are important to consider when we take coal out of the ground. Once the carbon becomes oxidized and turns into CO2 it will stay in the atmosphere essentially forever. Before we take coal out of the ground we have to give this the deepest of thought. 5

We have many ways of making electricity but once the CO2 is in the atmosphere it will be there essentially forever heating up our planet and accelerating feed back cycles. This is critical to think about before we take the coal out of the ground.

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #5--Caldeira on CO2 Reductions
Date: 04:40:26 PM Yesterday

HI Sarah—These are comments for the Wright Area DEIS.

The attached paper from Caldeira

Geo Phys Res Letters 35 L04705 (2008)

discusses the need to essentially reduce CO2 emissions to zero to start stabilizing the climate of the planet. This is a paper which should be cited and summarized in the Final EIS and the implications **clearly highlighted** in the Executive Summary and in the body of the EIS. 5

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #5--Accelerated Ice Melt--IPCC AR4 Too Conservative
Date: 04:42:40 PM Yesterday

Dear Sarah—These are comments on the Wright Area DEIS.

It is critical that the EIS discuss the strong evidence that, as dire as its predictions were, the IPCC Fourth Assessment was probably remarkably conservative when predicting the rate of climate change. While there will always be natural variability and cold winters to let us think that maybe all those scientists were wrong, but it is highly unscientific to think that a trend is made by one or two seasons. The climate scientists have carefully gathered and analyzed the actual data (not opinions of bloggers on the Internet...) and after 20 years of extensive scientific work (backed by the hundreds and hundreds of papers cited by the IPCC) they have concluded that global warming is "unequivocal." (See www.ipcc.ch) 6

Moreover, the rate of change is much faster than the most conservative IPCC models predicted--as shown by the rapid loss of Arctic sea ice in the summer.

As you probably know, it is now clear to the scientists that they underestimated the rate of loss of ice sheets in the IPCC Assessment 4. A few scientific articles (or their abstracts) are attached. These issues were generally not covered in the IPCC AR4. The articles are:

1) "Changes in the Velocity Structure of the Greenland Ice Sheet," Rignot and Kanagaratnam, Science 311, 986 (2006)

2) "Abrupt Increase in the Permafrost Degradation in Arctic Alaska," Jorgensen et. al. Geo Phys Res Letters 33, L02503 (2006)

3) "Permafrost and the Global Carbon Budget, " Zimov et.al. Science 312, 1612 (2006)

4) "Paleoclimatic Evidence for Future Ice-Sheet Instability and Rapid Sea-Level Rise," Overpeck et al. Science 311, 1747 (2006)

5) "Missing feedbacks, asymmetric uncertainties, and the underestimation of future warming," Margaret Torn, Geophys Res Letters 33, L10703 (2006)

All of this should be discussed in the Final EIS with the attached articles cited and summarized and the consequences **clearly highlighted** in the Executive Summary and the text of the EIS. The dynamic

melting processes that are beginning to occur are stunning the climate change scientists and I wish I was exaggerating when I say you can see, hear and feel the panic when these scientists speak about what is happening to the planet.

Before taking more coal out of the ground just to produce electricity when we have so many other good low- or non-carbon ways of producing the same electricity we need to carefully consider the impacts on the only planet we know of that supports life.

I'll send some of the data and articles from 2007 and 2008 when I next get a chance.

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #6- Risks to Species from CO2 Accumulation Plus Carbon Loss From Soils
Date: 04:45:22 PM Yesterday

Hi Sarah--These are coments on the Wright Area DEIS.

It is essential that the EIS discuss the fact that the CO2 that will be formed once the coal is taken out of the ground poses very serious risks to species all around the planet and this should be carefully analyzed and considered before issuing the Final EIS.

I've attached a few articles to get you going. They all contain many references that should also be discussed in the FEIS along with any scientific articles that appear before the FEIS is issued. I've added a couple of more on related subjects including the drying of the interior west and the increasing loss of carbon from the soils—one of the feedback loops that appears to be beginning. I've also included a classic Jim Hansen paper from 2005 on the energy imbalance on the planet. It is key to a thorough discussion of the science.

6

All of these articles should be cited and summarized in the EIS and the consequences **clearly highlgted** in the Executive Summary and the text of the EIS.

The articles are:

1) "Past Peak Water," SW Hydrology (2006)

2) "Carbon Losses From All Soils Across England and Wales from 1978-2003," Nature 437, 245 (2005)

3) "Extinction Risk From Climate Change," Nature 427, 145 (2004)

4) "Climate Warming and Disease Risks for Terrestrial and Marine Biota," Science 296, 2158 (2002)

5) "Earth's Energy Imbalance: Confirmation and Implications," Science 308, 1431 (2005)

6) "Coral Reefs Under Rapid Climate Change and Ocean Acidification," 318, 1737 (2007)

Clearly, the threat to species is much broader than just what will happen in the vicinity of the mines in the Powder River Basin. This must all be discussed and carefully considered before approving a lease to take more coal out of the ground.
Also the EIS should thoroughly discuss the irretrievable loss of sequestered carbon contained in the soils that will be disturbed by mining. Once disturbed it is highly likely that the carbon contained in the soils will be lost to the atmoshpere as either CO2 or CH4, further accelerating the feedback cycles of global warming and increased loss of carbon from the soils, permafrost, vegetation and oceans. All of this should be quantified and discussed in the EIS and the consequences **clearly highlighted** in the Executive Summary and the text of the EIS.

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #7--Quantifying the Impacts of Mercury, Coal Combustion Waste, Particu
Date: 04:48:49 PM Yesterday

Dear Sarah--These are comments on the Wright Area DEIS.

It is critical that the EIS discuss and quantify the health impacts that will result from the mining and burning of the coal from the proposed lease areas.

17

The National Environmental Policy Act was intended to help the federal government look carefully at impacts that will result from an action. As a result, the EIS needs to quantify the amount of sulfur, nitrogen, mercury, arsenic, particulates and other pollutants that will be released from the burning of the coal that would be mined if the lease is granted and to quantify the impact of those pollutants on the health and the environment.

16

Testimony recently entered at the Colorado Public Utilities Commission gives an example of how these calculations might be done and I've attached the testimony of the following:

20

Dr. Bruce Calonge MD, MPH, Chief Medical Officer, Colorado Department of Public Health and the Environment (Direct Testimony, Docket 07A-447E, Colorado Public Utilities Commission ) on the health benefits of coal plant retirements.

Paul Tourangeau, JD, Director, Air Pollution Control Division, Colorado Department of Public Health and the Environment (Direct Testimony, Docket 07A-447E, Colorado Public Utilities Commission) on the air quality benefits of coal plant retirements.
Leland B. Deck, PhD, Stratus Consulting on behalf of Western Resource Advocates (Supplemental Answer Testimony, Docket 07A-447E, Colorado Public Utilities Commission) on the air pollution benefits of retiring coal plants.

These testimonies can be used to help the EIS team begin to assess the very real environmental and health impacts that will come from the mining and burning of the coal in the South Gillette area. Leasing over 700 million tons of coal will have very real and very serious environmental

and health impacts and these should be quantified and clearly highlighted in both the Executive Summary and the text of the EIS.

We have many cleaner ways of producing electricity and these should be clearly presented in the EIS. 2

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #8--Recent Climate Science Underscores Urgency of Action
Date: 04:55:01 PM Yesterday

Hi Sarah--These are comments on the Wright Area DEIS.

I've attached two more recent articles on global climate change. They, once again, underscore the urgency of reducing emissions of CO2 as quickly as we can. Clearly leasing over 700 million tons of coal is a very large step in the wrong direction. 31

The articles are:

"Target Atmospheric CO2: Where Should Humanity Aim," James Hansen et al, The Open Atmospheric Science Journal 2, 217 (2008)
"On Avoiding Dangerous Anthropogenic Interference with the Climate System: Formidable Challenges Ahead," Ramanathan and Feng, Proceedings of the National Academy of Sciences 105, 14245 (2008)

The Hansen article makes the following statements:

"If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggst that CO2 will need to be redued from its current 385 ppm to at most 350 ppm, but likely less than that....An initial 350 ppm CO2 target may be achievable by pahsing out coal use except where CO2 is captured and adopting agricultural and forestry practices that sequester carbon. If the present overshoot of this target CO2 is not brief, there is a possibility of seeding irreversible catastrophic effects." (Abstract)

"Continued growth of greenhouse gas emissions, for just another decade, practically eliminates the possibility of near-term return of atmospheric composition beneath the tipping level for catastrophic effects." (page 229)

The Hansen article has 99 references to other scientific articles and is an example of the science that should be cited in the EIS for the coal leasing. To mix scientific findings with non-peer reviewed internet type arguments is inexcusable given the massive volume of peer reviewed

scientific literature that documents the existence and very real consequences of the emission of CO2.

The Ramanathan and Feng article notes that we are probably already committed to 2.4 degrees C of warming from greenhouse gases such as CO2 that have already been committed of which about 25% or 0.6 degrees C has been realized. That is--even without the CO2 that would come from the leasing of over 700 million tons of coal, the planet will be experiencing approximately 3 times as much warming as has already occurred. This speaks of almost unimaginable suffering and consequences for the only planet we know of that supports life. 5

These studies should be cited and summarized and the consequences should be **clearly highlighted** in the Executive Summary and the text of the EIS.

Leasing the coal in the proposed tracts will increase the amount of global warming experienced--beyond that already committed by previous emissions of greenhouse gases. We have fine alternatives for producing electricity--but we have no alternative what so ever for the planet and all of its systems which support humans and all the species we share the Earth with.

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS Comments #8 --Socioeconomic Costs of Extreme Weather Events
Date: 04:58:59 PM Yesterday

Hi Sarah--These are comments on the Wright Area DEIS.

With respect to the South Gillette DEIS, the socioeconomic assessment should include the costs of extreme weather evernts. Leasing coal will invariably lead to higher levels of CO2 in the atmosphere which will warm the planet, intensify the water cycle and increase extreme weather events. These are extremely costly whether you are talking about hurricanes, tropical storms, floods, forest fires or blizzards. All of these costs should be included in a discussion of the economic impacts of leasing over 700 million tons of federally-owned coal. 6

Making these calculations is difficult, but they should be included nonetheless. A few ideas on how to begin to value these predictable outcomes of leasing coal include:

> Refer to the Summary for Policymakers of Working Group II report of the IPCC(attached) for a summary of the science on climate change and extreme weather events and what the IPCC refers to as the "Social Cost of Carbon." See for example Table SPM 1 for a summary of extreme weather events that are likely. **On page 17, the IPCC concludes that the social cost of carbon (in 2005 dollars) is about US $43 per ton of carbon with a range of $10-$350 per ton of carbon. These numbers should be used**

**to calculate a range of socioeconomic costs for the proposed leasing of federally owned coal.**
The Nature paper discussing the European heat wave of 2003 (In which over 30,000 excess deaths occurred) gives some sense of the magnitude of what we are dealing with. I've attached several charts and chronology of billion dollar weather disasters in the United States from 1980-2007

References on damages from the June 2008 Midwest floods are found at the end of the Wikipedia entry as follows:
http://en.wikipedia.org/wiki/June_2008_Midwest_floods

Similar efforts should be made to determine the costs of droughts and forest fires and the 2008 Hurricane season etc. etc. As we oxidize the carbon in coal, we will be increasing the likelihood of all of these events.

Finally, and most importantly, leasing of coal from the proposed area can be predicted to contribute to extreme weather events **all over the planet** since CO2 is a very persistent, global pollutant as detailed in the scientific papers I've previously forwarded to you.

All of this should be discussed and a range of values for the "Social Cost of Carbon" based on the IPCC numbers should be included in the discussion of socioeconomic impacts of leasing federally owned coal.

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #9-Alternatives--CSP
Date: 05:01:40 PM Yesterday

Dear Sarah—These are comments on the Wright Area DEIS.

2

Before finalizing the EIS it is imperative that alternative ways of generating electricity be discussed.

There is lots of information readily available on wind and geothermal. A key technology for replacing steam fired plants is Concentrating Solar Power. This e-mail provides the following papers:

1) David Mills conceptual paper on meeting most of our electric needs with CSP

2) The Black and Veatch study of CSP benefits for California.

These summaries should be cited and summarized as part of a discussion of alternatives to blindly going forward with the mining and burning of coal. The availability of a cost-competitive, semi-dispatchable steam technology that is ready to scale **now** must be thoroughly discussed in the EIS and **clearly highlighted** in the Executive Summary and the text of the EIS.

Technical information is available at www.nrel.gov/csp/troughnet

We can boil water with sunlight and mirrors—we don't need to burn coal just to boil water.

The key to making this work is to build national transmission and start shipping electrons around the country instead of shipping coal on mile long trains. The key is to ship the finished product (i.e. electricity) not shipping the fuel (i.e. coal.)

We have more than enough solar potential to run the country many times over—but we have to decide the planet is worth it and not keep burning coal just to boil water because that is how they did it 100 years ago!

From: Leslie Glustrom <lglustrom@gmail.com>
Recipients: Sarah_Bucklin@blm.gov
Subject: Wright Area DEIS #10--Climate Summary from Copenhagen
Date: 05:08:09 PM Yesterday

Dear Sarah--These are comments for the Wright Area DEIS.

Attached is the synthesis report from the climate change conference in Copenhagen in March 2009. The synthesis report was released in June 2009.

The report summarizes thekey scientific findings since IPCC AR4 in 2007. It includes both a very readable summary and many key graphics summarizing the science. It represents the synthesis of the work of over 2000 scientists and should be summarized **and clearly highligted in the EIS and the Executive Summary.** 31

Thanks. Leslie

**Email Template #1: Text from general email campaign**

To: casper_wymail@blm.gov
Subject: Please protect our endangered grasslands

Dear Ms. Bucklin,

At a time when demand for coal is down, and climate change legislation is being debated, this is not the time to possibly sacrifice over 23,000 acres of Forest Service land to expanded strip mining. The prairie grassland is one of the most endangered ecosystems in the world. Wyoming's grasslands contain some of the most valuable prairie habitats remaining in the nation. At this time sacrificing these valuable public lands for expanded strip mining does not make sense for economic or environmental reasons. Please reject the Wright Area Coal Lease Application and protect the Thunder Basin National Grasslands. Thank you for hearing my concern. 7 14

Sincerely,

BLM received 111 emails that were nearly identical in content to the message above. Another 14 emails paralleled the message but also added the following statements, as condensed below:

- "…more eco-friendly wind farms, conservation and solar energy is the only viable direction we have to go in…"
- "…The Thunder Basin National Grasslands is a critically important patch for survival of the prairie dog and critically endangered black-footed ferret reintroductions…"
- "…One study cites that the entire electricity needs of this nation could be met utilizing solar mirror collecting stations…" 14
- "...Once an area has been strip-mined, we will never be able to restore it to it's original pristine beauty…"
- "…big energy companies ... are destroying our planet…" 9
- "…successful reclamation … must be completed before new lands can be disturbed…"
- "…the public interest does not include strip mining nor does it include oil shale extraction…"
- "…we are not some far away "moon" type colony to be mined of our resources…"
- "…public land is being taken away from the sport (of hunting)…please keep this land for our use…" 7
- "…Thunder Basin Grasslands are valuable habitat for not only sage grouse but also for prairie dogs and many other species…" 12
- "…the coal company's current production practices ruin the land to the point of the land looking like the moon and the land is destroyed for good…"

**Email Template #2: Text from general e-mail campaign**

To: casper_wymail@blm.gov

Subject: Wright Area Coal DEIS – Sarah Bucklin

Dear Ms. Bucklin,

I am writing to oppose the Bureau of Land Management's proposal to offer the Wright Area coal leases. Coal mining in the Powder River Basin of Wyoming is fueling global warming, leading to the release of 13 percent of the nation's greenhouse gases. The Wright Area coal leases threaten to mine more than 4 billion tons, potentially leading to the release of more than 10.5 billion tons of carbon dioxide.

Global warming threatens the wildlife, wild places, and wild rivers of the American West. It's time to shift away from coal. It's time for the Bureau of Land Management to be a leader in safeguarding the climate. 5

The health, sustainability, and prosperity of our future depends on clean energy. I call on the Bureau to take the first, big step by rejecting the Wright Area coal leases and embracing clean energy. Thank you. 14

Sincerely,

BLM received 369 emails that were nearly identical in content to the message above. Another 26 emails paralleled the message but also added the following statements, as condensed below:

- "…serious concerns about reclamation and impacts on hydrogeologic resources and endangered species as well as air pollution impacts…" 13
- "…the Powder River Basin needs to be designated as a coal production region and then the proper procedures followed…" 28
- "…federal land agencies should be finding areas that are suitable for renewable, non-polluting energy sources like solar and wind…"
- "seriously concerned with the BLM's inappropriate policy position ignoring the fact that coal is a major contributor to greenhouse gas pollution…" 6
- "…national security is energy security and there is no energy security or national security in any contribution to global climate destabilization…"
- "…with our economy on the rise, the power will shift towards clean energy…"
- "…we should exhaust other means of converting electricity from wind, solar, etc. before using more coal…" 14
- "…it is time the US set the example and pace needed to bring our world wide carbon dioxide levels down to 350 to avoid most of the disasters we are headed toward…"
- "…further exploitation of coal should be limited to very special circumstances…"
- "…our country bears a large responsibility for global warming by our decades of disproportional usage of fossil fuels, most especially coal…"
- "…the BLM should be taking the lead in requiring that new power sources be investigated…"

- "…we could easily cut back on our electricity consumption through some serious conservation methods…"
- "…the science clearly shows that more use of fossil fuels such as coal are destroying the earth's capacity to support life as we know it…"
- "…there is no excuse for continuing to mine and burn coal…"

6

14

"JHARRIGAN"
<JHARRIGAN3@mycap.rr.com
>

07/17/2009 02:00 PM

To <casper_wymail@blm.gov>

cc

bcc

Subject greenhouse gas emissions

6

Please DEMAND the BLM disclose the amount of greenhouse gas emissions from burning coal in the lease applications and also that it explore ways to mitigate these negative effects. !!!!!!! Nancy and John Harrigan

5

Joann Feist
<joannf34@gmail.com>
07/18/2009 02:29 PM

To casper_wymail@blm.gov
cc
bcc
Subject Please publish the facts

6

I am writing to ask BLM to disclose the greenhouse gas emissions form burning coal mined in the lease applications. Also, please consider ways to mitigate the global warming impacts of such emissions

5

With the promise of alternate ways to generate clean energy, what have we to gain by stepping up more use of coal and exempting present sites from responsibility for polluting?

Our planet just cannot absorb the continued use of coal as a significant producer of energy.

14

We haven't much time to lose. For Earth's sake, do the right thing!

Thank you.

Joann Feist
joannf34@gmail.com

bettyaharris @juno.com
08/19/2009 06:28 PM

To casper_wymail@blm.gov
cc
bcc
Subject Wright Area Coal DEIS - Sarah Bucklin

Sarah Bucklin

Dear Ms. Bucklin:

We can't continue to burn coal and keep a healthy planet. If you care about human survival you must put a stop to this.

You know that it is dangerous to continue to dig up the coal and put it into the air via burning it for electricity. When all the coal is gone we'll all be dead or most of the earth's species will any way.

Do the right thing and stop this. Please.

Sincerely, Betty Harris
313 W Lehow Ave Apt 24
Englewood, CO 80110

5

nward@cybermesa.com
08/19/2009 03:41 PM

To casper_wymail@blm.gov
cc
bcc
Subject Wright Area Coal DEIS - Sarah Bucklin

Sarah Bucklin

Dear Ms. Bucklin:

I am writing to support the Bureau of Land Management's proposal to offer the Wright Area coal leases. Coal mining in the Powder River Basin of Wyoming is necessary to reduce our reliance on foreign sources of energy. 31

Thank you

Sincerely yours,

Nelson Ward P.O. Box 1A Tererro, NM 8573

Sincerely, Nelson Ward
PO Box 1A
Tererro, NM 87573

August 21, 2009

BLM, Wyoming High Plains District Office
Attn: Sarah Bucklin
2987 Prospector Drive
Casper, WY 82604

BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
2009 AUG 24 A 8:22

Dear Ms. Bucklin,

As a lifelong resident of Wyoming I am extremely concerned about the current level of development on public lands. We are losing all that makes Wyoming a unique place to live. I have witnessed truly special places sacrificed to short-sighted development. The grasslands of Wyoming make up some of the most crucial prairie habitats left in the nation. Grasslands are some of the most endangered ecosystems in the world. 7

I ask the Bureau of Land Management to reject the Wright Area Coal Lease Application. This proposal sacrifices far too much public land. At a time when coal demand is down it makes no sense, environmentally or economically, to lease out so much Forest Service land. This land belongs to all of us. If this lease goes forward we will continue to make our public lands single purpose as opposed to multi-purpose use. According to your own Draft EIS (ES-60) the cumulative impact of all this development is causing a reduction in hunting opportunities. The sage grouse in particular is in serious danger of becoming endangered. What will the BLM do to mitigate the loss of this habitat? Reclamation is already falling far behind in comparison to newly leased lands. What is the BLM doing to speed up reclamation efforts in Wyoming? 14 12 9

As someone of Sioux heritage I am also deeply concerned that not enough is being done to ensure historical, cultural, and archeological sites are being preserved. Very little attention is paid to this in the EIS (4-86, 4-87, 4-88). How are you going to guarantee that blasting and draglines won't destroy valuable prehistoric sites? I am also concerned that all of the development in the Powder River Basin is having a significant negative impact on air and water quality in the Black Hills. 53

Sadly, Wyoming is being turned into an industrial wasteland. Please spare these public lands from destructive mining. It is time to work on preserving the remaining land in the Powder River Basin before it is all lost.

Thank you,

Lewis Poole

Lewis Poole
PO Box 7043
Sheridan, WY 82801

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION 8**
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: EPR-N

SEP 10 2009

Sarah Bucklin
Project Manager
Bureau of Land Management
Wyoming High Plains District Office
2987 Prospector Drive
Casper, WY 82604

Re: Draft EIS for Wright Area Coal Lease Applications
[CEQ# 20090209]

Dear Ms. Bucklin:

The U.S. Environmental Protection Agency (EPA) has reviewed the Bureau of Land Management's (BLM) Draft Environmental Impact Statement (EIS) for Wright Area Coal Lease Applications to assess the consequences of holding competitive sales for modified maintenance lease tracts on 18,000 acres of federally-owned solid minerals making available 2.570 billion tons of surface-minable coal in the Powder River Basin (PRB) of Wyoming. Our review and comments are provided pursuant to Section 102(2)(C) of the National Environmental Policy Act (NEPA), 42 U.S.C. Section 4332(2)(c) and Section 309 of the Clean Air Act, 42 U.S.C. Section 7609.

Air quality continues to be EPA's main concern for the energy activities in the PRB. Large surface coal mines have the potential to become particulate emission sources in the PRB contributing to air quality degradation. Although the Wyoming Department of Environmental Quality (WDEQ) has by statute, the authority and responsibility to require mitigation for air quality impacts, the Final EIS should propose additional mitigation measures for air quality impacts that are not directly related to the new leases such as additional dust suppression. During many recent years, air quality monitoring in the area has shown exceedances of the $PM_{10}$ standards (particulate matter less than 10 micrometers in diameter, commonly referred to as fugitive dust). Air quality modeling results from the PRB Coal Review (cumulative air quality effects) also predict additional increases in $PM_{10}$ emissions for this mining area, potentially causing exceedances of the air quality standard. Therefore, we are recommending that the Final EIS analyze more effective dust control measures than the current Best Available Control Technology (BACT) and Best Available Control Measure (BACM) practices and require additional mitigation to reduce fugitive dust from mining the lease tracts and the cumulative effects of mining in the surrounding area.

52

EPA also has concerns about the impacts of nitrogen dioxide emissions from cast blasting shots and whether the proposed mitigation is sufficient. Voluntary blasting restrictions to control public exposure to $NO_x$ emissions have not always been implemented. Depending on the proximity of public exposure to the explosive fumes, it may be appropriate to incorporate the mitigation measures into the terms of the leases. The most successful control measure would be to eliminate cast blasting entirely as the Eagle Butte Mine has done; alternatively, smaller shots using reduced amounts of explosives could become the standard practice. 32

The existing PRB Coal Review studies were used effectively in the Draft EIS discussion of the cumulative environmental consequences. We understand that an update to the PRB Coal Review air quality analysis is currently under consideration by BLM. This update is a proactive action by BLM that we support and we are always willing to provide assistance or participate in air quality working groups, if needed. Such an analysis might inform an appropriate control measure strategy to be developed to avoid any adverse impacts.

Consistent with section 309 of the Clean Air Act, it is EPA's responsibility to provide an independent review and evaluation of the potential environmental impacts of this project. In accordance with our policies and procedures for reviews under NEPA and Section 309 of the Clean Air Act, EPA is rating this Revised Draft EIS as EC-2 (EC - Environmental Concerns, 2 - Insufficient Information). This rating means that our review identified environmental impacts that should be avoided in order to fully protect the environment and the Draft EIS lacked sufficient information and analysis regarding impact mitigation and the analysis of the proposed action's impact on climate change. In addition to EPA's detailed comments on the Draft EIS, a full description of EPA's EIS rating system is enclosed.

Please see the following detailed comments for our specific environmental and informational concerns. If you have any questions regarding our comments or this rating, please contact me at (303) 312-6004, or you may contact James Hanley of my staff at (303) 312-6725.

Sincerely,

/s/ Robin Coursen (acting for)

Larry Svoboda
Director, NEPA Program

Enclosure

**Wright Area Coal Lease Applications DEIS**
**Technical Comments**

## Air Quality Modeling

1. Near Field Impacts -- Direct project impacts using the air dispersion model ISCLT3 for annual $PM_{10}$ and annual $NO_x$ concentrations were disclosed in the Draft EIS for base case and maximum emission scenario years for each of the three mines. No $PM_{2.5}$ impact analysis was conducted in the near field for the Draft EIS. In all cases the modeling predicted compliance with the $PM_{10}$ annual Wyoming Ambient Air Quality Standards (WAAQS). No 24-hour $PM_{10}$ near field predictions were made for the Draft EIS in conformance with the 1994 Memorandum of Agreement between EPA and Wyoming Department of Environmental Quality (WDEQ) that involves comprehensive air monitoring conducted in the area in lieu of $PM_{10}$ modeling. $NO_x$ modeling results were compared against the $NO_2$ National Ambient Air Quality Standards (NAAQS) (assuming 100% $NO_x$ to $NO_2$ conversion) and were generally lower than the NAAQS with one exception. For the Jacobs Ranch Mine year 2013, the $NO_x$ prediction was 55 ug/$m^3$ which exceeds the $NO_2$ NAAQS by 2 ppb. 33

Recommendation: The Final EIS should present potential $PM_{2.5}$ near field impacts from the project and identify measures to reduce the $NO_2$ impacts from the Jacobs Ranch Mine.

2. Additional $PM_{10}$ Mitigation -- Monitoring data in 2007 exceeded predictions of the WDEQ Permit Model. WDEQ approaches $PM_{10}$ control in the Wyoming PRB coal mines through use of a conservative Fugitive Dust Model to determine coal production levels that will not exceed the annual NAAQS at any monitor when required BACM (Best Available Control Methods) are used; and with monitoring data (in the absence of accurate short term models) to show that at actual production levels, 24-hour $PM_{10}$ NAAQS exceedances do not occur. 34

Recommendation: To ensure compliance with the $PM_{10}$ standards, EPA believes that either mine emissions or emissions from other area sources must be reduced before PRB operations are expanded to realize the upper range of future coal production. We recommend that the Final EIS add additional mitigation measures to reduce fugitive dust emissions. These mitigation measures would be in addition to BACM and should be incorporated into the terms of the proposed leases. Through our discussions with BLM on air quality, it appears that it may be more efficient for the lessees to be obligated for mitigation for other activities on BLM land or private lands.

3. $NO_x$, $NO_2$ & Ozone - Many of the voluntary blasting (cast blasts) restriction measures implemented by the mines appear to be successful in reducing or eliminating public exposure to high $NO_2$ emissions. However, $NO_2$ emission rates described in Section 3.4.3.2.1, page 3-70 of over 4,500 tpy for the Black Thunder Mine alone are very high and may contribute to visibility impairment and the formation of ozone. EPA is 35

concerned with measured ozone concentrations in the surrounding area. For example, the WDEQ's Thunder Basin National Grassland site has a design value of 72 ppb (2006-2008), which is very near the NAAQS of 75 ppb. Also, on June 26, 2009, EPA published a proposed revision to the $NO_2$ NAAQS. EPA is considering a new $NO_2$ NAAQS over a 1-hour averaging period of between 80 and 110 ppb. The EPA plans on finalizing the rulemaking on January 22, 2010. Given the short-term nature of the cast blasts coupled with a very high emission rate of over 4,500 tpy, we are concerned that compliance with the proposed $NO_2$ 1-hour NAAQS may be problematic.

Recommendation: Because of the high levels of existing ozone levels and our concerns with short-term $NO_2$ impacts, we recommend that the BLM and proponents should consider additional $NO_x$ mitigation strategies that would reduce visibility impairment, ozone and $NO_2$ concentrations in the area.

4. (Draft EIS section 3.4.3.2.1) Mitigation for Nitrogen Dioxide Emissions. On page 3-66, the Draft EIS states that Wright Area Mines have already implemented voluntary measures to reduce $NO_2$ emissions. Because the measures are voluntary, the mine operators may choose not to implement the mitigation measures. It should also be noted that the measures for the mines do not include a prohibition of blasting when conditions are unfavorable (large blast, wet conditions, weather inversions, little wind, wind direction towards residences/road, etc.) The existing mitigation merely requires notification and monitoring. 32

Recommendation: We recommend that a condition of approval be added to the lease prohibiting blasting when conditions are unfavorable. The mines would then need to analyze the size of blasts in conjunction with weather conditions and potential public exposure to prevent exceedances of the EPA and NIOSH recommended toxicity levels. The Final EIS also needs to more fully describe the types and levels of mitigation and how the mitigation will be implemented to reduce exposure to nitrogen dioxide. For example we understand that several of the mines have reduced the sizes of blasts, changed the composition of the explosive agents used for blasting, and/or changed the placements of blasting agents.

**Specific Air Quality Narrative Comments**

5. The Executive Summary (ES) presents significance levels for fugitive dust and tailpipe particulates and includes a short discussion of other existing air pollutant sources. EPA recommends inclusion of a summary of the greenhouse gas emissions analyzed in Section 3 and 4 within the Executive Summary. 36

6. ES-36. It would be helpful to present the value for the annual $NO_2$ NAAQS within the text so that readers may make comparisons to the maximum modeled $NO_x$ concentrations shown on Figures ES-8, ES-9, and ES-10. 37

7. Figure ES-11. Explain in the text why a 3-mile buffer was chosen to depict the potential for public exposure to emissions from surface mining operations. 38

8. Tables 4-11 through 4-14 of the Draft EIS disclose potential cumulative impacts that were tiered from the October 2008 PRB Coal Review Cumulative Air Quality Effects project. The PRB Coal Review disclosed cumulative adverse impacts from $PM_{2.5}$, $PM_{10}$, and visibility impairment at Class I areas under the three modeled scenarios. Specifically, for both the lower and upper coal development scenarios in 2015, the 24-hour $PM_{2.5}$ prediction is 179.5 $\mu g/m^3$ (NAAQS is 35 $\mu g/m^3$) and the annual $PM_{2.5}$ prediction is 18.7 $\mu g/m^3$ (NAAQS is 15 $\mu g/m^3$). For both the lower and upper coal development scenarios, the $PM_{10}$ modeling predicted 24-hour impacts of 512.8 $\mu g/m^3$ (NAAQS is 150 $\mu g/m^3$). These predictions are all well over the NAAQS for $PM_{2.5}$ and $PM_{10}$. The 1994 Memorandum of Agreement between EPA and WDEQ does incorporate monitoring in lieu of short-term $PM_{10}$ modeling. However, for planning purposes we believe the type and location(s) of the emissions contributing to these concentrations should be presented in the Final EIS. Since the PRB Coal Review modeling work is under consideration by BLM, we believe this updated analysis should capture all sources within a modeling domain large enough to determine cumulative impacts including $PM_{10}$, ozone and visibility. The analysis should also present source attribution contributions associated with the locations of predicted elevated pollutant levels. Such an analysis might inform an appropriate control measure strategy to be developed to avoid the predicted adverse impacts. 39

9. 3.4.1.1 (Table 3-8) Assumed Background Air Pollutant Concentrations. This table contains references to several air monitoring site data collected generally from 2002-2004. The Table units are presented as ug/$m^3$, however, for some of the parameters it appears that ppb units may be shown instead. We recommend using consistent units throughout the table. It also appears that some of the units are incorrect. Please ensure units are correct. In addition, there are much more recent data available from 2006 and 2007 that should also be incorporated into the table. 40

    a. The background concentration for $NO_2$ is listed for the Thunder Basin National Grassland Monitoring Site, which is located more than 20 miles north of Gillette. Please replace this location with the WDEQ site southwest of Gillette which generates $NO_2$ monitoring data and would be more representative of true background conditions. 41

    b. Data for $SO_2$ should be updated to include more recently measured concentrations at the Wyodak Site 4 monitoring station in Campbell County, Wyoming. 41

    c. It is unclear why data from Eagle Butte Mine was used for background $PM_{10}$ in Table 3-8. There are numerous nearby $PM_{10}$ monitoring sites in the southern PRB, including the WDEQ site southwest of Gillette. For air quality analysis purposes, data presented as Background Data should be data that represents base case ambient conditions near the proposed action. 41

    d. Page 4-42 references the Memorandum of Agreement between the WDEQ and EPA (January 24, 1994). A condition of the agreement is to continue $PM_{10}$ 42

monitoring near the mine to ensure compliance with the 24-hour $PM_{10}$ NAAQS. BLM should ensure that the mine operator(s) consult with the WDEQ on any monitoring site adjustments or additions due to the proposed expansion of the active mine area. Particular attention should be made to placement of monitors closer to the active mine areas in order to determine maximum impacts from the mines.

10. Section 3.4.2.3, Page 3-63, text states that "While PRB mining operators have already implemented these control measure in practice, formal approval of the NEAP [Natural Event Action Plan] for the mines in the PRB by EPA Region VIII is still pending". EPA Region VIII approved the WDEQ NEAP on March 13, 2007. 41

11. Section 3.4.2.3, Page 3-63, the full paragraph describes the NEAP for the mines in the PRB in the context of an Exceptional Event; this is no longer strictly applicable. The Exceptional Event Rule of March 22, 2007 no longer requires a NEAP. However, according to the preamble to the Exceptional Event Rule (Signed March 22, 2007, Effective May 21, 2007), "The EPA believes that it is advantageous for States to keep NEAPs in place that are currently being implemented in order to address the public health impacts associated with recurring natural events such as high wind events. However, following the promulgation of this rule, States will no longer be required to keep NEAPs in place that were not approved as a part of a SIP for an area". We believe the NEAP should be retained because it provides the flexibility to control other emission sources, like fugitive emission sources, that otherwise might not be controlled with BACT. We believe the BACM specified in the NEAP contains an appropriate and reasonable minimum level of control as required under the Exceptional Event Rule for the PRB coal mines. Additional mitigation of $PM_{10}$ should be introduced if $PM_{10}$ exceedances occur at Wright Area Coal Lease mines. 41

12. We recommend that the Final EIS disclose that emissions from coal combustion have been identified as a significant source of atmospheric mercury. EPA's web site at http://www.epa.gov/mercury/report.htm has several reports summarizing the environmental impacts of mercury, primarily bioaccumulation in the aquatic food web. Concentrations of mercury emitted as a result of combustion vary depending on the chemistry of coal deposits and the type of air pollution controls. 20

Recommendation: For purposes of the Final EIS, we recommend including any existing information on mercury emissions from power plants currently burning coal from the PRB mines.

**Cumulative Environmental Consequences**

13. Adverse visibility impairment impact days were also identified in the Draft EIS. These include 26 days at Badlands National Park, 32 days at the Northern Cheyenne Indian Reservation and 18 days at the Wind Cave National Park for the lower 2015 Coal Development scenario. 39

Recommendation: The Final EIS should add additional mitigation measures to reduce the days of visibility impairment in these Class 1 areas. Since the PRB Coal Review modeling work is under consideration by BLM, we believe this updated analysis should capture all sources within a modeling domain large enough to determine cumulative impacts including $PM_{10}$, ozone and visibility. The analysis should also present source attribution contributions associated with locations of predicted elevated pollutant levels. Such an analysis might inform an appropriate control measure strategy to be developed to avoid the predicted adverse impacts.

14. Section 4.2.14.1 presents an analysis regarding global climate change and Greenhouse Gas (GHG) emissions. EPA recommends the following updates and changes to this section:

    a. Greenhouse gas emissions from burning the coal should be calculated in the Final EIS and reported in millions of metric tons $CO_2$-equivalent per year or comparable units. Although the coal is sold as a commodity, the emissions can be calculated using coal production and emissions factors. For a more detailed analysis, the BLM may want to consider calculating the differences in $CO_2$ emissions from the combustion technologies described in the Draft EIS (standard combustion, IGCC, advanced pulverized coal, circulating fluidized bed). 43

    b. The Final EIS should disclose the measures the coal mines are using or plan to use to reduce or mitigate direct greenhouse gas emissions, including but not limited to reduction of coalbed methane and railroad locomotives' emission reductions. Mitigation measures designed to reduce the GHG emissions per unit of coal produced needs to be analyzed. 43

    c. The Final EIS should update the information regarding climate change modeling. For example, the last two paragraphs on page 4-110 of the Draft EIS, starting with "Tools necessary to quantify incremental climatic changes associated with those factors for the projected development activities in the PRB are presently unavailable" and the last paragraph on page 4-110 should be deleted or rewritten to describe current climate change prediction modeling. 43

    d. The last paragraph of Section 4.2.14 suggests that estimates of greenhouse gas emissions from the combined or cumulative mine operations can be found at Section 3.4.5, but the reference should be to Table 3-24 found in Section 3.18.2 on Page 3-307. 43

The broader cumulative impact analysis should also factor in the success of reclamation and mitigation plans for various resources. Mining reclamation works well for restoring some aspects of resources such as grazing livestock and wildlife, and visual aesthetics. Other resource values may take a longer time to return to full function or may not be restorable at all (e.g., wetlands, groundwater, and unique habitats). 44

Recommendation: We recommend that the impact sections for resources that are substantially impacted by cumulative impacts be reevaluated to determine how the impacts will overlap in time and for the resource as a whole. For example, does the timing of maximum impact from other activities (e.g., coalbed methane) coincide with the peak of impacts from coal mining? Are any resources impacted by coal mining approaching sustainability limits because of cumulative impact levels?

**Wetlands**

15. (Section 3.7.3) Wetlands Compliance, Mitigation and Monitoring. The wetlands mitigation plan needs to be amended to compensate for the long-term loss of wetland values during and following mining. The mitigation ratios may need to be increased to compensate for the temporal loss of wetlands. Wetlands obviously cease to function during the 10 to 20 years of mining. However, wetlands fed by groundwater will not regain function until the ground water table recovers. We recommend that additional mitigation be established to compensate for the long-term loss of wetland values. The mitigation plans for previous or current reclamation may provide good locations for increasing wetlands in the area. Alternatively, the mines may want to improve other wetlands damaged by overgrazing, poorly constructed roads, or off-road vehicle damage. 23

**Wildlife**

16. (Section 4.2.8.4) Special Status Species. The analysis for wildlife impacts should be based on the habitat needs of the species of concern, rather than the specific boundaries of the mines and lease tracts. There also needs to be sufficient analysis to understand the impacts of the Lease by Application (LBA) decisions. For example, on page 4-71, the Draft EIS states that no sage grouse leks occur within five miles of the Wright Area Coal LBA tract. It is unclear if the absence of nesting areas is important to the decline in sage grouse population or if there are sufficient numbers of leks nearby to sustain the population. In addition, this information does not appear to be consistent with the cumulative impacts discussion in the last paragraph of page H-67, which states that "Given the absence of grouse, and the limited quantity and marginal quality of potential grouse habitat in the area, US Department of Agriculture-Forest Service Management Direction guidelines for Management Indicator Species (MIS) do not apply to this project." By looking at sage grouse habitat on a component-by-component basis and mainly on LBA and mining properties, the impacts of the LBA decisions on the health and sustainability of the grouse population in this area are not presented . We note that a full biological assessment and evaluation document is being prepared for review in addition to the information in the Final EIS analysis. 12

# U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

## Environmental Impact of the Action

**LO - - Lack of Objections:** The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

**EC - - Environmental Concerns:** The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

**EO - - Environmental Objections:** The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

**EU - - Environmentally Unsatisfactory:** The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

## Adequacy of the Impact Statement

**Category 1 - - Adequate:** EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

**Category 2 - - Insufficient Information:** The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

**Category 3 - - Inadequate:** EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

All Paws Veterinary Hospital, Inc.
1732 Highway 71
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Dr. Thomas Kass,1732 HWY 71, Wall NJ, 07719 phone 732-449-8585, fax 732-449-8060, e-mail: allpawsvet@optonline.net

August 24, 2009

To: Sarah Bucklin

Bureau of Land Management

Wyoming High Plains District Office

2987 Prospect Dr.

Casper, WY 82604

RE: EIS for Wright area coal lease applications.

To Whom it may concern: Due to a BLM shortage of EIS copies I only recently recieved the EIS and have yet to recieve the supplement and this has delayed my response.

The EIS is deeply flawed and it and the lease should be rejected: please consider each of the following points.

1.) Catastrophic Methane release as an outburst or incremental loss:

1.A.) The EIS does not consider the risk of an outburst of methane as has been recorded 16 times in coal mining history (Beamish and Crosdale, 1998). The EIS does recognize the PRB coalbed aquifers are not confined and are interconnected. No attention has been paid that once these connections or aquitards are dewatered that gas can flow up just as water flows down. CBN water drawdown is up to 625 feet with methane pressures up to 311 PSI ( Clarey, 2009). Ground subsidence fracturing and dewatering will allow gas to flow into the highley conductive Wyodak aquifer and out the mines or surface. If the entire PRB methane reserve was vented it would equal ten years of entire US green house emission. 47

The EIS fails to realistically account for methane release through out. The EIS uses unpublished data from coal core samples taken "near the mine" (EIA page ES-29) and the DOE study of emmisions for 2006 {DOE/EIA-0638 (2006)(EIS page 4-122). That study (DOE page 50-51) states: "methane emissions from U.S. surface mines have not been systematically measured" and bases it's estimate on the premise on "methane has had ample opportunity to migrate to the surface before mining". Future PRB mining will have hundreds of feet of overburden and thus have more in common with the geology of underground mines. CBN operators do not mine coal to extract methane and the validity of using ambient temperature coal core samples to measure mine methane is fallacious. Kirchgessner et al (2000) developed methods for direct atmospheric measurement at mine surface. Total PRB CBN methane reserves are estimated at 10 trillion cubic feet in 10 billion tons of coal or 1,000 cubic feet per ton. Kirchgessner et al (2000) states 160 to 670 cubic feet of methane is liberated for each ton of coal mined. Kirchgesser is the only study to actually measure methane release in surface mines. The Powder River Basin coal reserve is currently the most productive methane source in the US. Methane liberation needs to be continously measured and monitored. If the methane in the proposed coal lease was released due to past lease activities as the EIS states then the proposed coal lease activity will simply

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liberate methane from more distant coal. We are facing a real global crisis and we need to measure and manage not speculate before making decisions involving such large portions of our national emissions. Methane must be measured continuously at each of the following: a.] migration directly of free gas into the mines; b.] release during excavation; c.] release during crushing; d.] loading; e.] transportation; and f.] at the end user. Methane has yet to be measured in CBM or mine water. With 174 billion gallons of of CBM water already pumped even at standard pressure, temperatures and solubility the equivalent of 60 million tons of CO2 has been released as methane with the water at a minimum. It seems ridiculous that small public landfills in the US are required to collect methane and yet here where the magnitudes are thousands of time higher we do nothing but speculate. As PRB mining leaves the more exposed ancient burn or clinker zone and moves into deeper, wetter and pressurized coal: release will logically increase.

2.) EIS misrepresents PRB carbon footprint:

The EIS miscalculates PRB coal mine emissions on page, 3-307, 4-115 and 4-118. On page 4-115 the EIS's figure estimates CO2 from coal combustion at power plants only and on page 4-118 it uses uncorrected DOE dry coal values (USDOE/EIA-0121,1994/Q1) for wet coal calculations. Vorres (1988) reports wet (as is)btu,oven dried btu, water and carbon for some Wyoming coals. PRB coal water consumes almost one third of the btu value and is principally why it has a low btu value. Simply put that's much more CO2 for less energy and accounts for the low price of PRB coal compared to more efficient coals. The DOE has ongoing studies of coal drying as part of "clean coal" initatives but nothing has been implemented. In addition to this rather large mistake the EIS doesn't take into account mine diesel, mine explosives, mine electric use, railroad diesel and energy used to create materials and equipment for the mine, railroad and power plant. The EIS does infer it's inaccurate coal combustion figures can be compared to more comprehensive carbon footprints for non chemical power generation (nuclear, hydro, solar, geo and wind). Using SEC quarterly reports for Peabody and Union Pacific and the UP's depreciation schedule of 4.2% for durable equipment a more complete and accurate 2006 assesment is:

790 million tons of CO2 from coal (440 x 0.49 X 44/12) { "as is"coal wt.X Carbon content by wt.X CO2 constant}

2.5 million tons of CO2 from mine diesel {SEC report derived}

35.6 million tons of CO2 from railroad diesel {SEC and railroad assoc derived}

2.1 million tons of CO2 from mine explosives{SEC report derived}

2 million tons of CO2 for annual steel usage for all {4.2% depreciation of total steel}

__ million tons of CO2 for annual concrete usage {data unavailable to author}

__ million tons of CO2 for mine electric earth moving drag lines {data unavailable to author}

150 million tons of CO2 equivalence {until methane release is measured: assume Kirchgessner's high}

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978 million tons of CO2 for the PRB coal mines {minus electric and concrete demand} verses EIA's 716 mt



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{ Calculations: Peabody coal reports consuming 130 million gallons of diesel to produce 255 million tons of coal, extrapolating from that data for the 440 million tons of coal produced in the PRB would be: 130 X 440/255 or 224 million gallons of diesel times 22.38 lbs CO2/ gal.converted to tons yields 2.5 million tons of CO2. The EIS estimate is 1/5 th of this. PRB coal companies move 1/2 a cubic mile of ground a year and the EIS values on page 3-307 are fictitious. The Ammerican Association of Railways publishes rail statistics for 2006 and more. Currently a train can move a ton 430 miles for one gallon of diesel, a wonderful accomplishment. A rail shipment of 100 tons of coal (the revenue portion) requires the movement of 100 additional tons (the wt. of hopper car etc) this is for the paid trip, hidden is the fact in the raw material business the rail cars must be transported back empty (actually uphill for an elevation change of over 4,000 feet) so to deliver a ton of coal a mile involves 3 tons to be moved a mile. The last data available for PRB coal was average one way trip of 1,037 miles (Gerking and Hamilton,2008). So 1,037 times 440 million tons of coal times the factor of 3 we get 1.37 trillion ton miles devided by 430 ton miles to gallon we get 3.18 billion gallons X 22.38 lbs CO2/gal devided by 2,000 lbs/ton we get 35.6 million tons of CO2. These calculations are the bare or minimal conversions of carbon in fuel and do no include the larger carbon imprint that would include energy used to explore, collect, transport and refine the deisel.}

The EIS fails to consider coal markets for 500 miles around the mine are saturated with cheap inefficient PRB coal and any increase in supply will involve long haul shipping to distant markets {i.e.; an even larger carbon footprint for each added ton}. That the power plants require more efficient coals to fire boilers at peak energy times. The EIS fails to consider that one of the most economical means of counter balancing the greenhouse gas problem is to simply increase sulfer emissions. It also fails to consider the risk of the nation being dependent on a single coal source if other coal mines are forced to close.

The race to use wasteful PRB coal may have more to do with gaining valuable carbon credits than simpley to use the cheapest fuel.

The coal industry has had a public relations victory with it's illusion: "clean coal technology". The Powder River Basin is the most ideal location in the nation and perhaps the world for "clean coal technology" yet the coal industry recently got approval to build a conventional power plant to service it's own needs ( 7,000 volt electric excavators). It's common in the region for various industries and mines to have their own power plants as a cost saving measure. The two principal clean coal technologies are: coal drying and CO2 sequestration. Power generation with it's massive waste heat and CO2 emissions located next to a wet coal mine and oil field is as good as it will ever get. Currently the Powder River Basin is a net consumer of mined CO2 piped in from hundreds of miles away. Drying PRB coal would make it competitive with coals costing four times as much. The two principal clean coal iniatives {coal drying and CO2 sequestration} located at one place would result in the smallest handling and transportation costs possible. So why isn't it being done? Unfortunately it's probabley fraud. The current author has worked in a technical capacity on pilot plants involving drying, calcining, slaking, coal fired turbines, and uranium milling. I know a full sized plant must be built and the remaining problems worked out by a complete spectrum of engineers and equipment fabricators on a full scale basis. A successful process would be worth billions of dollars to the developer in liscensing fees. The fact the coal industry is not doing so is as clear an indication they don't believe it will work. NO NEW CLEAN COAL PLANT: NO NEW COAL LEASE!

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3.) Coal dust.

This is a simple problem. The arrogance of this industry to not solve this problem verbally. A number of solutions would pay for themsIves in a short amount of time. Covering the rail cars would increase fuel efficiencies by better aerodynamics and coal dust would be retained (stopping product coal loss). Wyoming's land scape should not be soiled by a black mark from coal dust

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and the prairie fires caused by coal dust spontaneous combustion.

4.) Water, radium and radon.

The coal industry has intentionally violated the spirit and intent of the EIS process by buying CBM/CBN rights to aggressivelly draw down the aquifer prior to getting the permit. Any intentional act taken before a permit is issued in generally a serious violation of land use law. 26

Radium and Radon contamination of water has not been addressed. The involved water is likely to be contaminated or become contaminated by unnatural infiltration and perking in many localities in the PRB. Rice, Ellis and Bullock (2000) described PRB waters as high in iron, manganese, low sulfate water with a Ph around 8. Yet that study measured uranium and not radium and radon. The geochemistry and solubilities of radium and uranium are different and opposite (Zapecza and Szabo,1986). Zapecza and Szabo (1986) found a direct correlation for high radium in low uranium waters with high iron, high manganese, low sulfate water with a Ph around 8. Even if the CBM water's don't contain radium they must be considered a leachate for liberating radium and moving it down into the water table. Rain water leaches uranium from exposed igneous rock (Rocky Mountains) and the uranium can be concentrated in the sediments of waterways having specific conditions. This process yields very localized deposits which are abundant in the PRB. Ancient uranium deposits decay to high levels of radium and radon. Radon as a heavy gas difuses. Radium is either fixed or solubilized depending on geochemistry.CBM water will change the existing geochemistry and may liberate radium. These isotopes are abundant in the basin and the failure of our public agency to monitor them and the associated risks is unfortunate. Mine radon hopefully is being monitored as mining becomes deeper the flushing action of air movement will become impared. Aquifers for drinking must be monitored. 50

Sincerely:

Dr. Thomas Kass

PS: Feel free to contact me at the above. top of page phone, fax and e-mails

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CASPER FIELD OFFICE
2009 AUG 31 P 1:39

DORSEY
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MICHAEL DRYSDALE
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August 25, 2009

**VIA ELECTRONIC MAIL**

Ms. Sarah Bucklin
Wyoming High Plains District Office
Bureau of Land Management
2987 Prospector Drive
Casper, WY 82604

Re: Wright Area Coal DEIS

Dear Ms. Bucklin:

On behalf of Ark Land Company ("Ark Land"). we respectfully submit these comments to the Draft Environmental Impact Statement (DEIS) for the Wright Area Coal project, as noticed in the Federal Register on June 26, 2009 (74 FR 30570). We comment on three specific areas – (1) global climate change; (2) Alternative 5; and (3) the Lease-by-Application Process.

**1. Discussion of the Cumulative Environmental Consequences of Global Climate Change and Greenhouse Gas Emissions (Section 4.2.14.1)**

Overall, the DEIS contains a thorough and balanced discussion of global climate change and greenhouse gas emissions. In particular, the science of climate modeling has not advanced to the point of reasonably forecasting the impacts of individual emission sources. However, the discussion of legislative developments at the federal level should be updated to reflect recent events in this fast moving policy area, such as the introduction and passage in the United States House of Representatives of the American Clean Energy and Security Act of 2009 (Waxman-Markey bill). In addition, the DEIS would benefit from an updated discussion of voluntary greenhouse gas reduction, crediting, and reporting programs, such as the Western Climate Initiative, as another mechanism encouraging market-rational management of greenhouse gases. 43

**2. Alternative 5: Delaying the Sale**

Section 2.7.2 of the DEIS discusses, but does not analyze in detail, the alternative of delaying the sale of one or more of the LBA tracts to obtain higher bonus and royalty payments and to allow CBNG resources to be more completely recovered prior to mining. Ark Land Company agrees with the BLM's decision not to analyze this alternative in detail. 31

Although the DEIS states that Powder River Basin coal prices have been steadily increasing since mid-2007, in fact there has been a downward trend in coal prices since the beginning of 2009. The recent price volatility underscores the difficulty in predicting the price of coal and, by extension, bonus and royalty payments to the government. Due to the lengthy

lease and permitting processes, predicting the price of coal at the time of sale is very difficult. Aside from the predictability of coal pricing, the LBA coal leasing process protects the federal coal sales process from price volatility by reserving to the BLM the right to reject bids that fail to reflect market value as determined by the BLM. Moreover, it not clear whether coal pricing reflects or results in any particular environmental issue appropriate for analysis under an environmental impact statement.

In addition, Ark Land Company agrees with the BLM's analysis of the development of coalbed natural gas resources (CBNG) on the tracts. Delaying the sale of the tracts would not result in the recovery of more CBNG because CBNG recovery is likely to continue post-sale. Moreover, it is likely that most CBNG has been, or will have been by the time coal mining operations commence, produced from the studied lands, and as discussed in the DEIS, there are ample mechanisms available to the BLM to balance any remaining CBNG production and coal development.

**3. Lease By Application Process**

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We are aware that commenters to other recent Environmental Impact Statements in the region have criticized the LBA process and called for a "recertification" of the Powder River Basin Coal Production Region. We do not believe a project-specific EIS is the appropriate place to consider recertification, which implicates broad policy concerns that reach beyond the specific tracts at issue in this DEIS. In any event, as the Wright Area Coal DEIS illustrates, the LBA process ensures that the federal government receives competitive bids for the coal. The LBA process is more efficient than the regional coal leasing process, with the result that the federal government receives federal and state royalties and taxes more quickly than it would through the regional coal leasing process. In addition, any claim that LBA applicants reduce competition by designating the tracts they wish to lease is undercut by the BLM's ability to reject bids or reconfigure the tracts, as is illustrated by Alternatives 2 and 3, the BLM's preferred alternatives in the Wright Area DEIS, which are different than the tracts proposed by the applicants.

Thank you for your consideration of these comments.

Sincerely,

Michael Drysdale

cc: Doug Downing
Dave Finnerty
Mike Rowlands
B.J. Sturgill
William Prince

COPY

Williams.

Production RMT Company
300 North Works Avenue
Gillette, WY 82716-3043
307/686-1636
307/686-7574 fax

August 11, 2009

BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
2009 AUG 14 P 12: 51

**Bureau of Land Management**
**Wyoming High Plains District Office**
**Attn: Sarah Bucklin**
**2987 Prospector Drive**
**Casper, WY 82604**

RE: Wright Area Coal Lease Applications EIS:

Dear Ms Bucklin,

Williams Production RMT Company appreciates the opportunity to comment on the Wright Area Coal Lease Applications EIS.

**Regarding 3.3.2.3 (p3-31)Regulatory Compliance, Mitigation and Monitoring:**

The reservoir analyses conducted by the A&C (2008) indicate that most of the recoverable conventional oil and gas resources on the North Hilight Field, South Hilight Field, West Hilight Field, West Jacobs Ranch, North Porcupine, and South Porcupine LBA Tracts have been extracted by the existing wells. Reservoir analyses conducted by the BLM WSO-RMG indicate that most of the recoverable CBNG resources in the Wyodak-Anderson coal zone on these six LBA tracts have probably been produced by the existing wells. Potential does exist for conflicts between coal operations and CBNG and conventional oil and gas wells completed in formations and coal zones below the Wyodak-Anderson seam.

If the federal coal in the tracts is leased and conflicts do develop between the operators of the oil and gas wells and the surface coal mine operators, there are several mechanisms that can be used to facilitate recovery of the conventional oil and gas and CBNG resources prior to mining. These include:

- BLM will attach a Multiple Mineral Development stipulation to the federal coal lease, which states that BLM has the authority to withhold approval of coal mining operations

that would interfere with the development of mineral leases issued prior to the coal lease (see Appendix D).

- Conventional oil and gas wells must be abandoned while mining and reclamation operations are in progress but could be recompleted or redrilled following mining if the value of the remaining reserves would justify the expense of reestablishing production.

- BLM has a policy in place on CBNG-coal conflicts (BLM Instruction Memorandum No. 2006-153), which directs BLM decision-makers to optimize the recovery of both resources and ensure that the public receives a reasonable return (BLM 2006a). This memorandum offers royalty incentives to CBNG operators to accelerate production in order to recover the natural gas while simultaneously allowing uninterrupted coal mining operations. In addition, this memorandum also states that it is the policy of the BLM to encourage oil and gas and coal companies to resolve conflicts between themselves; when requested, the BLM will assist in facilitating agreements between the companies.

- Mining of these LBA tracts cannot occur until the coal lessee has a permit to mine the tract approved by the WDEQ/LQD and a MLA mining plan approved by the Secretary of the Interior. Before the MLA mining plan can be approved, BLM must approve the R2P2 for mining the tract. Prior to approving the R2P2, BLM can review the status of CBNG and conventional oil and gas development on the tracts and the mining sequence proposed by the coal lessee. The permit approval process generally takes the coal lessee several years, during which time CBNG resources can continue to be recovered.

- Prior to mining the federal coal, the coal lessee can negotiate an agreement with owners and operators of existing oil and gas facilities on the tract, including owners and operators of oil and gas well and pipeline facilities, regarding removal and relocation of those facilities prior to mining.

**Comment:**

Williams Production RMT Company (WPC) has interest in wells or operates wells within the Coal Lease Application Area. WPC feels that it is critical that the optimization and economic depletion of the CBNG resource be completed before mining is allowed to occur. Within the IM provided related to this issue, it is important as stated that the rights and lease obligations of the CBNG lessee are honored. 51

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WYOMING STATE OFFICE
2008 AUG 14 P 12:5

**Regarding Referenced Instruction Memorandum No. 2006-153 (3-31):**

**Comment:**

- WPC understands that they will receive timely notice of development within the Conflict Administration Zones (CAZ) so that they have time to develop all applicable leases within the CAZ. Further, WPC understands that any permits to develop CBNG will be given priority within the CAZ. This will allow extraction of as much of the CBNG resource as possible before a conflict with the advancing mine. WPC or other lessees may show cause why they should not be required to produce the CBNG in such a manner that 51

will maximize recovery of the federal natural gas prior to the removal of the coal by supplying satisfactory proof supporting their assertion to the AO. This proof must factor in a royalty rate reduction of 50 percent (43 CFR 3103.4 and 43 CFR 3103.4-1)

WPC understands and considers the potential availability of incentives such as a royalty rate reduction to encourage development to be critical. WPC also considers it critical that in most cases, permanent reclamation of the well sites, access roads, pipeline rights of way, etc. may not be required, but only stabilized sufficiently to prevent erosion or other negative environmental impacts. 31

Thank you again for allowing WPC to provide comment on this EIS.

Sincerely,

Penny Bellah
Regulatory Team Lead
Williams Production RMT Company

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BUREAU OF LAND MANAGEMENT
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2009 AUG 19

eog resources

**EOG Resources, Inc.**
600 Seventeenth Street
Suite 1100N
Denver, CO 80202
Tel: (303) 572-9000
Fax: (303) 824-5400

August 18, 2009

Bureau of Land Management
Casper Field Office
2986 Prospector Drive
Casper, WY 82604
Attention: Sarah Bucklin

Re: EOG Resources, Inc.'s Comments on the Wright Area Coal Lease Application Draft Environmental Impact Statement

Dear Ms. Bucklin:

EOG Resources, Inc. (EOG) is pleased to comment on the Draft Environmental Impact Statement for the Wright Area Coal Lease Applications (DEIS) released by the Bureau of Land Management (BLM) on July 8, 2009, but noticed by the Environmental Protection Agency (EPA) on June 26, 2009. 74 Fed. Reg. 30569 (June 26, 2009). EOG owns and operates federal, state, and fee oil and gas leases within the State of Wyoming, and in the potentially affected portions of the Powder River Basin, and asks the BLM to consider these comments on the Wright Area DEIS.

EOG has reviewed the Wright Area DEIS and believes the BLM has generally, adequately analyzed the potential environmental impacts of leasing the Wright Area Coal Lease Applications. EOG is concerned, however, because the BLM did not adequately analyze potential consequences that future coal leasing may have upon conventional oil and gas development in southern Campbell and northern Converse Counties, Wyoming. There is considerable existing and planned future oil and gas development directly east of the South Porcupine Lease by Application, BLM Serial Register WYW-176095. Additionally, significant conventional oil and gas development could take place directly east of the North Porcupine Lease by Application, BLM Serial Register WYW-173408. In general, the BLM's information regarding feasibility of future conventional oil and gas development in the vicinity of the Rochelle, North Antelope, and Antelope Mines is outdated and inaccurate. In recent years, the BLM's analyses has focused largely upon the potential impacts coal mining may have upon coal bed natural gas (CBNG) development and has not accurately considered the potential impacts of conventional oil and gas development. As technology continues to improve, oil and gas

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2009 AUG 19 A 9:33

operations have become possible in areas which have been previously undeveloped or currently underdeveloped. The BLM has an obligation to maximize the production of domestic oil and gas natural gas resources, as well as coal resources, and should not favor one type of development over another. When issuing the various leases analyzed in the Wright Area DEIS, the BLM should include appropriate stipulations and conditions for approval to allow coal and oil and gas development to co-exist to the maximum extent possible. This is particularly true in situations where the oil and gas leases predate the coal leases by years or even decades. 51

Section 3.3.2.1.1 – Conventional Oil and Gas

The BLM's analyses of potential impacts to conventional oil and gas in the Wright Area DEIS is outdated and does not accurately account for more recent conventional oil and gas development taking place within the region. In particular, the January 2008 reserve assessment prepared by Allen & Crouch Petroleum Engineers, Inc. (Allen & Crouch) of conventional oil and gas resources in the general Wright Analyses Area fails to mention or account for conventional oil and gas wells developed in the last several years. The BLM must analyze the potential impacts to more recent development in the area. Based on the sparse information contained in the Allen & Crouch report, it is difficult to discern how the BLM evaluated potential impacts to conventional oil and gas development. Additional information must be provided in order for oil and gas operators such as EOG to understand how the proposed coal leasing may impact its operations in the area and how future coal leasing and development may impact operations farther to the west. The Wright Area DEIS asserts on page 3-24 there has been a 15-year period of very little conventional oil and gas development activity in the Powder River Basin. This information is again, out-of-date, as increased oil and gas prices and advances in technology have made oil and gas development in the Powder River Basin more economic. Such continued oil and gas development will be far more likely in the future. The BLM must provide additional information regarding the potential impacts coal leasing may have upon oil and gas development in the Powder River Basin. 72

Section 3.3.2.3 – Regulatory Compliance, Mitigation and Monitoring

The BLM indicates on page 3-31 of the Wright Area DEIS it will attach a Multiple Mineral Development stipulation to federal coal leases stating that the BLM has the authority to withhold coal mining operations that would interfere with the development of mineral leases issued prior to coal leases. Given the increased potential for oil and gas development in the southern Powder River Basin it is imperative the BLM attach this stipulation to any and all coal leases issued in the area including the Wright Area Coal Lease Applications as well as the still pending West Antelope II Coal Lease Application. The BLM's policy to maximize the recovery of resources and value to the State of the Wyoming and the United States' Treasury demands that BLM maximize production of oil and gas development as long as possible. Doing so not only 51

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2009 AUG 19 A 9:33

provides much needed revenue to the State of Wyoming and the United States Treasury it also helps to achieve American energy independence. Although development of Wyoming's vast coal resources is important to the State and U.S. Treasury, the United States currently imports vast quantities of oil, as compared to coal, and the federal lands play an important part in correcting this dangerous imbalance. EOG strongly encourages the BLM to impose Multiple Mineral Development stipulations on any and all coal leases issued within the Powder River Basin. Such stipulations should clearly require BLM's long held policy first in time, first in right.

Section 3.11.1 – Affected Environment

As the BLM acknowledges on pages 3-236 and 3-238 of the Wright Area DEIS, the southern portion of the Powder River Basin contains an extensive and important network of oil and natural gas transportation pipelines that are critical to both conventional and CBNG production in the entire region. The BLM has not adequately analyzed the potential impacts of moving these facilities, and thus, disrupting production and transportation, may have upon oil and gas development in the region. The BLM's current analysis is inadequate and does not accurately analyze the potential consequences to oil and gas development if these important transportation pipelines and corridors are disrupted for a significant period of time. 8

Section 4.1.2.1 – Conventional Oil and Gas

The BLM also suggests on page 4-20 of the Wright Area DEIS that conventional oil and gas production is expected to peak in 2010 in the Powder River Basin and decline thereafter. Given recent advances in technology and different development techniques, this information is likely inaccurate. Significant quantities of conventional oil and gas can be developed from the Powder River Basin making it very unlikely that peak production in the area will occur in 2010. In fact, based on recent developments, conventional oil and gas development in the Powder River Basin may be entering a new and productive era. The BLM must update the information analyses in the Wright Area DEIS. 72

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2009 AUG 19 A 9:33

Conclusion

Please place EOG on the mailing list for the Final Environmental Impact Statement and the Record of Decision for the Wright Area Coal Leasing Applications and please develop appropriate stipulations to ensure that coal operations are not advanced to the detriment of past or potential future conventional oil and gas operations in the Powder River Basin. If you have any questions please contact Eric Dillé, Government Relations Director, at 303-824-5542 or eric_dille@eogresources.com

31

Sincerely,

**EOG RESOURCES, INC.**

Eric A. Dillé

Eric A. Dillé, P.G., R.E.M.
Government Relations Director

COPY

**CHEYENNE RIVER SIOUX TRIBE**
**Cultural Preservation Office**
**P.O. Box 590**
**Eagle Butte, SD 57625**

July 6, 2009

Bureau of Land Management
Wyoming High Plains District Office
Att: Sarah Bucklin
2987 Prospector Drive
Casper, WY 82604

BUREAU OF LAND
MANAGEMENT
CASPER FIELD OFFICE
2009 JUL 13 A 7 57

RE: 3425 (LBA)
WY922 (Love)
WYW164812 (North Hilight Field)
WYW174596 (South Hilight Field)
WYW172388 (West Hilight Field)
WYW172685 (West Jacobs Ranch)
WYW173408 (North Porcupine)
WYW176095 (South Porcupine)
Wright Area Coal EIS

Dear Sarah:

In response to the request for comment, this is central to the "Section 106 Review CFR 800.2 *Consultation on Historic Properties of significance to Indian Tribes and Native Hawaiian's.* The Cheyenne River Sioux Tribe (CRST) would like to be further involved in this process.

In the Wright Area Coal Lease Application EIS stated, "No Native American heritage, special interest, or sacred sites have been formally identified and recorded to date..." However, the CRST has a vested interested in those Cultural Resources (CR) and Traditional Cultural Properties (TCPs) that may have an area of potential effect (APE), however it is not clearly stated in Volume 1 of 2 under 4.211.1- 4 *Cultural Resources and Native American Concerns,*" what cultural resources may be affected? 71

As part of the 36 CFR 800.4 *Determine the identification of effects* that when identifying cultural sites, the CRST Cultural Preservation (CP) Field Technician is involved, and that other Tribes may be present during the surveys at these APE's to ensure the best practices for

identifying TCPs. The TCP's should be carefully researched, through ethnography and oral history interviews, or identified in the research and appropriately conducted, reviewed and that these TCP's are identified appropriately.

While our consultation should not end here, we expect to be involved in this process. The best practices and guidance between the Bureau of Land Management Wyoming State Offices, the WY District-Wide Field Offices and the CRST will agree to recommend the best practices to respond to the APEs. Although cultural preservation processes vary greatly among the many Tribal nations that you encounter, we hope that your agency will carry-out appropriate identification and protocol with our interests in mind. 71

Sherry Means

Pilamaya/e (Thank You),
Sherry Means
Tribal Historical Preservation Officer (Acting)
CC: File (2)

**Telephone: 605-964-7553** **605-964-7554** **Fax: 605-964-7552**

Donald A. Simpson
State Director
Bureau of Land Management
Box 1828
Cheyenne, Wyoming 82003-1828

RECEIVED
JUL 29 2009
Bureau of Land Management
Casper Field Office

Mr. Simpson:

I would like to comment on the Environmental Impact Statement for the Wright Area Coal Leases.

I am a member of the Board of Directors of the Rockpile Museum in Gillette, Wyoming. It is the county owned museum and reflects in our collections the history of Campbell County and a large part of the Powder River Basin.

We know that there are a large number of archaeological and historical sites in the area that has been taken by coal mining and we have heard of several fossil sites that were located on the mines. The draft environmental statement makes reference to sites that will be destroyed by the process of the mining.

We have a very hard time even finding out that a site has been found and excavated, let alone getting information or reports of the site. At times the finding of a site has been totally denied. We feel that the Rockpile Museum should have access to this material and reports. They are dealing with a large part of Campbell County history and we feel that the artifacts should be exhibited here. The museum is also an educational facility and we should have copies of the reports for the finds that have been excavated in the county.

63

It is not our intention to compromise the integrity of a site but for those sites that are in the mine area, we fail to see how our obtaining information on the site can compromise anything. After the site is destroyed, there can be nothing left of the original finding and all that is left is a small historical record and that belongs in Campbell County at the Rockpile Museum.

May I request that the Rockpile museum be added to the distribution list for all future studies in Campbell County?

Thank you,

Leland (LJ) Turner
605 Turnercrest Road
Gillette, Wyoming 82718

BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
2009 JUL 31 A 11: 34

BUREAU OF LAND MANAGEMENT
WYOMING HIGH PLAINS DISTRICT OFFICE
Attention: Sarah Bucklin
2987 Prospector Drive, Casper, Wyoming 82604

MS. BUCKLIN:

I would like to submit this commentary to the Draft Environmental Impact Statement for the Wright Area Coal Lease Applications.

Our ranch is located in the five feet drawdown of water area and we have lost a number of National Grassland grazing permits to the mining area so I feel that we are definitely impacted by the development in the area. I was surprised to find out that we have been deleted from the BLM's list and request that we be added to the notification list for all statements in the future. I have submitted written comment on other draft studies.

Our ranch was homesteaded by my family here in 1918. In the 1930's when the area now known as the Thunder Basin National Grassland was first put together, my family obtained grazing rights in the Thunder Basin. Since that time we have used and depended on summer grazing in the Basin as an integral part of our ranch program. Our use in the Thunder Basin was only as permit holders on grazing leases as the deeded portion of our ranch is some 15 miles to the west. For me personally, my first experience with trailing cattle back and forth to the Thunder Basin came in 1941 as a baby in a cradle.

In 1991, after my mother's death the ranch was probated, appraised by the IRS and eventually passed on to my children. In the IRS appraisal the Thunder Basin grazing permits were appraised as an integral and necessary part of the ranch with a tax bill that had to be paid for the value placed on these permits. We have never received a penny in compensation for the loss of these permits, nor have we asked for reimbursement with the thought that when the mining was reclaimed, we would get the pastures back.

54

This year our grazing allotment has shrunk to some thirty head of cattle and according to the draft impact statement, our grazing will be completely gone if the mine expansion goes through. The draft statement alludes to …."a temporary reduction of livestock grazing….." on page ES-51.

Since the coal mining has started in the Porcupine- North Antelope area we have had to disperse a good number of our cattle and of the remainder, we now feed out our bulls in Colorado, our heifers in Nebraska and our older cows in the Black Hills of Wyoming. Prior to the mining we were able to operate everything from this ranch and we did not have a couple hundred mile drive to manage our cattle.

It appears to me that the claim of "reclamation" is questionable, if our pastures are being reclaimed, why then are we losing all of our summer grazing over there? It

would seem to me that if there was any reclamation that there should be some place there that we could use to run more than these thirty cattle that we are now allowed.

As damaging and costly to us as the loss of our pastures is, that cost is dwarfed by the loss of our water. We are in the "five feet drawdown" area and we are losing our springs and seeps and our wells. Without water we simply can not exist as an operating ranch.

On page ES 36 and E- 137, mention is made that, ...."the rate and extent of the actual drawdown in the coal is much greater than the predicted life of mine drawdown..."

We are seeing this everyday. Our ranch is on Bates Creek, a tributary of Antelope Creek. We used to have a number of spring holes with fish in them; a good "swimming hole" and a large spring that my parents and neighbors depended on to get their supply of ice each winter for the coming year. That is all gone now for "5 feet" of drawdown wipes out many of the springs in this entire area or reduces them to a weed choked mud hole that is often hazardous to livestock or wildlife. The page 3-127, mentions that ..."springs are uncommon....". Has anyone from the coal mines or the BLM ever looked? Perhaps these spring holes on the creek do not fit the concept of Rocky Mountain spring water that the coal mines prefer to use?

Since the mining has started, we do not have a fish on the ranch today, there is no place to swim unless mud wrestling is your thing and we have no place on the ranch where I can take our grandchildren to cut a block of ice to make a freezer full of ice cream.

On 3-115, it mentions that ... ."28 wells are being monitored....", and I see by your map in Figure 3-22 that a well is being monitored and it is listed as PRCC-21B. That is in what remains of our allotment and there is a well there although I do not know if your monitored well is our windmill.

64

I do know that I attempted to find and obtain records on our well there for my own information and future plans. I requested information on this well from the office of the Wyoming State Engineer. My request for this information was refused because our name was not on the water right filing even though we had paid a share of the cost of the well. I also pointed out that the well was on Forest Service Land and that the information should be a matter of public record. They continued to refuse to divulge the requested information.

I then approached the Forest Service and the Thunder Basin Grazing Association for their assistance in obtaining this information and was told by both entities that I had ..."no need for the information...".

I feel that it is essential for all information on the water in the area to be available, whether it is good or bad for either the coal company or the people that live here. How

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CASPER FIELD
2009 JUL 31 A 11

can people make an intelligent appraisal of the situation if they are not able to obtain full information to make their decision on?

We have had a problem with access crossing the railroad ever since the railroad was built. I believe that the crossing was designed with several cattleguards for the access road along the track and a fence to direct the livestock into the crossing tunnel. It has never been built. At the curve where the railroad crosses Porcupine Creek there have been a number of derailments that have destroyed the fence. In the past we have attempted to maintain the fence and at the railroad crossing have finally started building wings of portable corral panels when we cross to keep the livestock off of the railroad itself. Since Campbell County is moving the county road to run along the railroad through our pasture, I hope that we will be able to have a fence that will not be torn up regularly and perhaps the county will help us get a crossing for livestock.

Usually about once a year we will see a fire smoldering along the railroad right of way that is in the coal dust that has blown off the trains. 49

An observation on Air Quality would be that at our ranch some 15 miles west of the mine, we can regularly look 150 miles to the south to see Laramie Peak and we can look 150 miles to the northwest to see Cloud Peak in the Big Horn Mountains and when we go over to check on cattle, there are many days that we can not see across the mine sites, a distance of possibly 5 miles. 42

I would urge that a NO ACTION status be applied to this proposed expansion at this time. I get the sense that across our nation more and more people are concerned with global warming and clean energy and at this time we are facing an economic slowdown in the energy industry. Why try continue the "boom" forever? If the coal has been there for a million years or so, why the frantic hurry to mine it in the next few years? Why should we destroy a way of life for ranchers in Wyoming with the added loss of clean air and the loss of our water adding an incalculable cost to the price of the coal. 14

One thing I did not find in the draft environmental impact statement was any mention of where our water will come from if industry is successful at dewatering the Powder River Basin. Everywhere I look in the west the lack of water is a problem so how can it be ignored here?

Thank you for the opportunity to file this statement.

Leland (LJ) Turner
605 Turnercrest Road
Gillette, Wyoming 82718

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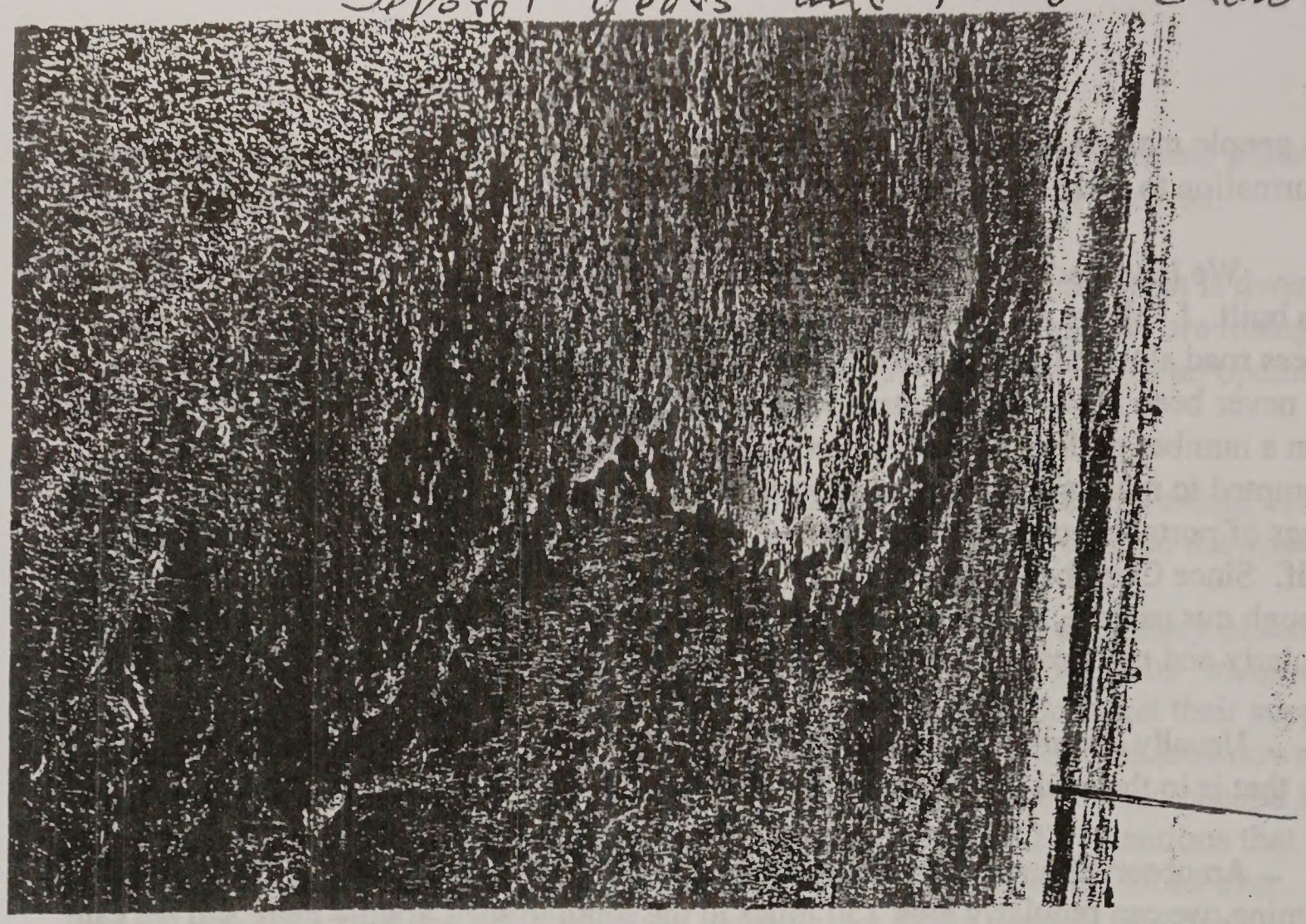
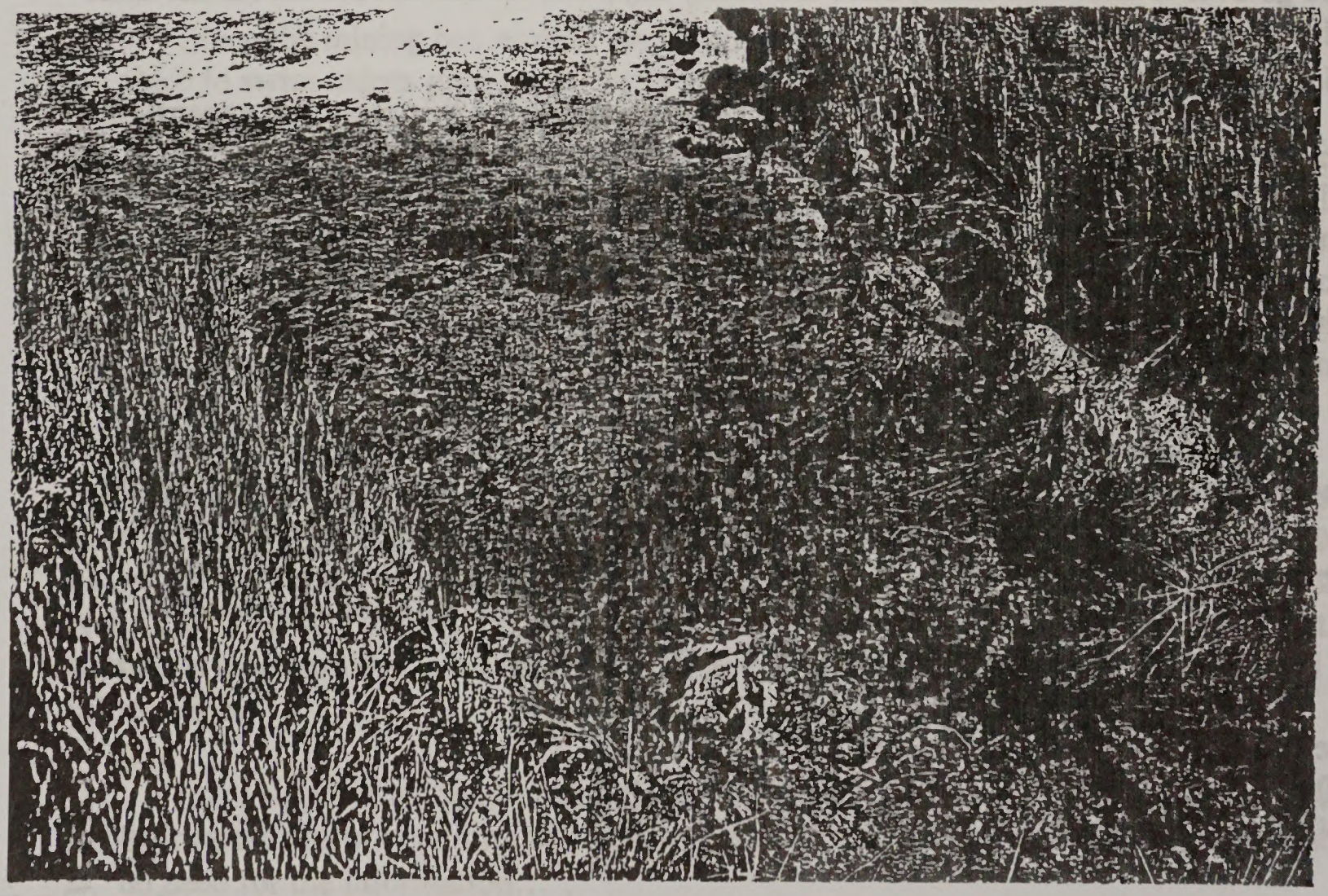
CASPER FIELD OFFICE
2009 JUL 31 A 11: 34

What a spring looks like after several years and ft of drawdown





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2009 JUL 31 A 11:

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CASPER FIELD OFFICE
2009 OCT 15 P 1:24

Bureau of Land Management
Wyoming High Plains District Office
ATTENTION: SARAH BUCKLIN
2987 Prospector Drive
Casper, Wyoming 83604

MS Bucklin

I am aware that it is very late to submit anything for inclusion in the Draft Environmental Impact Statement for the Southern Campbell County Coal Mine Expansion but I just had an encounter with Peabody Coal Company that I feel should be included.

Our ranch is west of the primary coal mine area and we had some hunters back at the ranch this fall that had first hunted with us over fifty years ago. They accompanied us in moving our cattle from our Forest Service Grazing Permit east of Teckla back to the main ranch in the 1950's and in addition they had hunted in the area that has been consumed by the coal mines.

Some of the people expressed a desire to see the coal mine area and as I had to go over there, I offered to show it to them. We drove down the Matheson road to where it crosses under the railroad and into the first of our Forest Service Allotments on Porcupine Creek. There is heavy construction work there building a new road for the coal mines' access. We continued on past the site of the old Teckla Post Office and along the Antelope Road where our Honeymoon Draw Forest Service allotment is. They wanted to see the main mine facility so we went down the road, through our allotment and approached the Peabody mine facility and stopped on the road prior to getting to the guard shack so they could shoot a picture.. At that point we were intercepted by a Peabody employee that ordered us off of the property.



I introduced myself and explained what we wanted but was told that Peabody owned all of the land east of the Antelope Road, that we were trespassing on their private property, that we could not take pictures. He informed me that I did not have a grazing permit on Honeymoon Draw and left no doubt that we were to get the hell off of there immediately. We did.

In the past I worked at the Jacob's Ranch and Black Thunder Mines during the construction phase and openly carried a camera and was never questioned or challenged for doing so at those mines. In the past I have checked in at some of the mines and was able to get people a brief tour of the facilities and was met with courtesy and answers to people's questions.

In approaching the Peabody facility I did not expect anything else and was totally surprised by the arrogant display of authority that we were met with. I had felt that we had a reasonable relationship with the mine and their employees as we will get several calls a year from them when they find cattle out on the road right of way. We have always thanked them for calling us and checked to see what needed to be done to remedy the situation.

I have always assumed that the paved roads into the mine sites were at least, "public" roads and I feel that the coal mine's need for portions of our grazing permit for their access should at least earn me the right to drive down the damned road. After we

were run off by the Peabody employee I checked on the way out for any sign that identified the road as solely Peabody's property. There was none.

With our loss of grazing land and surface water to the coal mine I questioned the need for an enlargement of the mine area. Today, after seeing their attitude first hand I do not feel that this is the Wyoming that I knew or that I care to see develop in our state.

I do not know what Peabody is afraid of or is trying to hide at their mine site. The Wyodak mine east of Gillette used to have an overlook so tourists could see the mine and you could even buy a postcard of the facility. I feel that was more a part of the area and a better example of Wyoming than this arrogance exhibited by Peabody. If this is an example of coal mine expansion and what we can expect here, I don't want any part of it.

I would like to suggest that if Peabody or other mine companies can legally ban public access on the mine roads around and through the mine area that the fact should be prominently and publicly displayed. If they can legally prohibit photography in the mine area, that fact should also be prominently displayed. If Peabody wishes to develop some sort of Nevada test site, "Area 51" they no doubt have the right to do so but the fact should be evident. When people take a drive to do some sightseeing, they are not looking for a confrontation.

Perhaps I overlooked the item in reading through the draft environmental statement but I recall NO mention that access and photography would be denied in the mine area. I see now that the coal mine is polluting the air, depleting the water, destroying the pasture and now they are denying access and prohibiting photography, Just what else do they demand? They do not need to expand.

Thank you.

7

Leland (LJ) Turner
605 Turnercrest Road,
Gillette, Wyoming 82718

Lj/cc:
United States Forest Service
Thunder Basin Grazing Association
Campbell County Board of Commissioners
Harold Shriner, Peabody Coal

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2009 OCT 15 P 1:24

August 24, 2009

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CASPER FIELD OFFICE

2009 AUG 26 P 2:58

Bureau of Land Management
High Plains District Office
Attn: Sarah Bucklin
2987 Prospector Drive
Casper, WY 82604

Dear Ms. Bucklin,

Thank you for the opportunity to comment on the Black Thunder West Hilight Field LBA/Study Area Environmental Impact Statement. As private people, we would appreciate any effort to keep our names and address confidential.

As long time active members of our community, we have strived to be what is held in highest Wyoming esteem: Good Land Stewards and Good Neighbors. As such, we were disappointed in the 1 page out of 554 on the original EIS, and the 1 paragraph on the supplement handed out at the July 29, 2009 meeting, being devoted to agriculture. We were further dismayed to have our and our neighbor's livelihood, cultural contributions and community activities reduced to AUMs lost.

Our family ranch goes back many years in this area. Some of our deeded land in Sections 21 and 34 has been included in the Study Area. We also own land bordering the LBA in Sections 7 and 18. But, the glue that has enabled this ranch to survive in the livestock/grass business is our Forest Service leases in Sections 8,9,17,18,19,20,21,22,27 and our State of Wyoming lease of Section 16.



The loss of these grazing leases will be devastating to our ranching operation. Our deeded land will not sustain a viable livelihood in the livestock/grass business in even the best of grazing years. There are very few available options for our lands.

Please keep our situation in mind as you go through the steps of this LBA.

Thank you for any help possible.

Sincerely, Thomas W. Edwards
Leah B. Edwards

Thomas W. and Leah B. Edwards
94 Edwards Rd. HCR 83
Gillette, WY 82718
(307) 939-1266

WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4610

Web site: http://gf.state.wy.us

GOVERNOR
DAVE FREUDENTHAL

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STEVE K. FERRELL

COMMISSIONERS
CLIFFORD KIRK – President
ED MIGNERY – Vice President
CLARK ALLAN
AARON CLARK
JERRY GALLES
MIKE HEALY
FRED LINDZEY

August 14, 2009

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Bureau of Land Management
Casper Field Office
Wright Area Coal DEIS
WYW164812 (North Hilight Field)
WYW174596 (South Hilight Field)
WYW172388 (West Hilight Field)
WYW172685 (West Jacobs Ranch)
WYW173408 (North Porcupine)
WYW176095 (South Porcupine)
Campbell County

Sarah Bucklin
Bureau of Land Management
Casper Field Office
2987 Prospector Drive
Casper, WY 82604-2968

Dear Mr. Bucklin:

The staff of the Wyoming Game and Fish Department has reviewed the Draft Environmental Impact Statement for the Wright Area Coal Lease Applications. We offer the following comments for your consideration.

The six proposed coal leases lie within the Highlight Pronghorn, Cheyenne River Pronghorn, Thunder Basin Mule Deer, and Rochelle Hills Elk Herd Units. Pronghorn use much of the areas for yearlong and winter yearlong habitat. No crucial winter range for pronghorn is contained within the project area. Mule deer in the region utilize portions of the project area as yearlong habitat. Elk frequent areas surrounding the proposed coal leases, utilizing these areas mainly as winter yearlong habitat. Removal of sagebrush and grassland habitats will reduce overall forage for all three of these big game species. We recommend implementing effective restoration activities following mining practices that strive to restore sagebrush and native forbs (Medcraft and Clark 1986, Gamo and Anderson 2002). 31

The BLM draft EIS for the Wright coal leases recognized the existence of several sage grouse leks on or directly adjacent to the proposed coal leases. The area also provides breeding, nesting, brood-rearing, and winter habitat for sage grouse. The BLM concedes that several leks will

likely be destroyed by mining activity should the coal leases proceed as planned in Alternatives 1 and 2. While the aforementioned leks are not within any of the "core areas" defined by the Governor's Sage Grouse Task Force, the loss of entire leks and their associated nesting and wintering habitat certainly constitutes an impact on local sage grouse populations. If these coal leases are approved, we recommend that mining companies continue to improve reclamation techniques that in time provide suitable habitat for sage grouse. 12

WGFD recommends that wildlife surveys be performed to detect the presence of sensitive or threatened species prior to activities that disturb new areas. Surveys should also be continued to document active nests of raptor species present on the coal leases. A 1/2 mile buffer around each nest should be maintained where possible. Exceptions may be granted based on topography or other site-specific factors and as coordinated with USFWS. Nesting sites that are destroyed should be mitigated by creation of new nest site options, either nest platforms or nest boxes where applicable.

Some portions of the proposed coal leases contain United States Forest Service (USFS) surface lands that are a part of Thunder Basin National Grasslands. Loss of these areas to mining will result in reduced recreational opportunities for the public in a part of Wyoming where accessible public land is already limited. Both hunting and other outdoor recreational utilization will be lost on those portions of USFS lands that are leased for coal extraction. WGFD recommends that the BLM and USFS investigate the possibility of working with the coal industry to facilitate land exchanges and/or purchases to provide replacement public lands for recreational use on the Thunder Basin National Grasslands. 7

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Heather Obrien, Wildlife Biologist at 307-682-1579 or Scott Gamo, Staff Terrestrial Biologist at 307-777-4509.

Sincerely,

John Emmerich
Deputy Director

JE:MF:gfb

cc: USFWS
H. Obrien, L. Jahnke, WGFD Sheridan

Gamo, R. S. and S. H. Anderson. 2002. Use of reclaimed minelands by pronghorn antelope and mule deer. Intermtn. J. Sci. Vol. 8. 4:213-222.

Medcraft, J. R. and W. R. Clark. 1986. Big game habitat use and diets on a surface mine in northeastern Wyoming. J. Wildl. Manage. 50:135-142.

BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
2009 AUG 18 P 1:23

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

**Ecological Services**
**5353 Yellowstone Road, Suite 308A**
**Cheyenne, Wyoming 82009**

BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
2009 SEP -2 P 1:56
AUG 31 2009

**In Reply Refer To:**
**ES-61411/W.02/WY09FA0183**

**Memorandum**

COPY

**To:** Environmental Protection Specialist, Bureau of Land Management, Wyoming High Plains District Office, Casper, Wyoming, Attention: Ms. Sarah Bucklin

**From:** Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming Scott Hicks

**Subject:** Comments on the Wright Area Coal Lease Applications Draft Environmental Impact Statement

Thank you for your letter and attached draft Environmental Impact Statement (DEIS) for the Wright Area Coal Lease Applications, dated June 17, 2009, received in our office on June 26. The DEIS analyzes the environmental consequences of leasing six tracts of Federal coal reserves totaling approximately 21,885-acres, located in Campbell County, Wyoming. In your letter you requested the U.S. Fish and Wildlife Service (Service) review the DEIS and provide comments.

In response to your request to review the proposed action, we are providing you with comments on (1) threatened, endangered and candidate species. The Service provides recommendations for protective measures for threatened and endangered species in accordance with the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

**Specific Comments**

Appendix G, Page G1-13, Ute ladies'-tresses - Existing Environment: The second paragraph states that Habitat Management Inc. has identified potential habitat within the North Hilight Lease By Application (LBA) analysis area. We recommend that the final EIS discuss the location and amount of potential habitat identified for each of the LBA tracts. The final EIS should also note the dates of all surveys conducted for the Ute ladies'-tresses (*Spiranthes diluvialis*) orchid within each of the LBA tracts. 67

Appendix G, Page G1-14, Ute ladies'-tresses - Existing Environment: The first paragraph states, "previous surveys have been conducted during the flowering period within the existing Black Thunder Mine permit area (e.g., for each of BLM's EISs analyzing the environmental impacts of leasing the LBA tracts obtained by the mine since 1992, as listed in Table 1-1 of this EIS) and no 68

Ute ladies'-tresses orchids were found during any of those surveys." Surveys conducted for previously leased LBA tracts may or may not have included lands being analyzed in this EIS. If the Bureau of Land Management (Bureau) has survey information from previous Ute ladies'-tresses orchid surveys that included all or a portion of the current proposed LBA tracts, the results of those surveys should be described in the final EIS and biological assessment. We recommend that all Ute ladies'-tresses survey reports used in this analysis be included in an appendix to the final biological assessment.

Appendix G, Pages G1- 15, G2-14, G3-16, G4-15, G5-17 and G6-16, Ute ladies'-tresses - Effects of the Proposed Project: For each of the six proposed LBA leasing actions analyzed in the DEIS and biological assessment the Bureau has determined that Alternative 2 (the Bureau's preferred alternative) "may affect, but not likely to adversely affect" the Ute ladies'-tresses orchid. However, in the following paragraphs on each of the above referenced pages it states, "nonetheless, if undetected populations are present on the ephemeral streams in the general analysis area, they would be lost due to surface disturbing activities."

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We recommend that any potential habitat that has not already been surveyed for Ute ladies' tresses within the six LBA tracts be identified and surveyed prior to surface mining activities. In addition, the Bureau should identify lease stipulations for each of the six LBA tracts in the final EIS that will protect populations of Ute ladies'-tresses, should they be found to occur within the LBA tracts.

Appendix G, Page G1- 15, second paragraph: The fourth sentence in this paragraph states, "as described above, Black Thunder Mine has conducted multiple orchid surveys of suitable habitat over multiple years during the known time of flowering using USFWS accepted techniques." However, the DEIS does not provide references for these surveys. We recommend the final EIS include references to all supporting surveys used to make your determinations of affects for threatened and endangered species.

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Appendix G, Pages G1- 19, G2-18, G3-20, G4-20, G5-22 and G6-21, Blowout Penstemon - Effects of the Proposed Project: For each of the six proposed LBA leasing actions analyzed in the DEIS and biological assessment the Bureau has determined that Alternative 2 (the Bureau's preferred alternative) "would have no effect on the blowout penstemon." However, in the following paragraphs on each of the above referenced pages it states, "if undetected populations are present, they could be lost to surface disturbing activities." Since blowout penstemon could occur in these areas, we recommend the final EIS address this recent species update by including language such as:

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*"Habitat for the blowout penstemon (Penstemon haydenii) will be identified prior to any surface disturbing activities. If suitable habitat (e.g., sparsely vegetated active sand dunes or sand dune blowouts) is determined to be present on the site, surveys will be conducted for the presence of this species. If the species is found, a 0.25-mile no surface disturbance buffer will be placed around the population consistent with the Bureau's Biological Assessment (BLM 2005)."*

For our internal tracking purposes, the Service would appreciate notification of any decision made on this project (such as issuance of a permit or signing of a Record of Decision or Decision

Memo). Notification can be sent in writing to the letterhead address or by electronic mail to FW6_Federal_Activities_Cheyenne@fws.gov.

Thank you for the opportunity to comment on the Wright Area Coal DEIS. If you have any questions regarding this letter or your responsibilities under the Act, please contact Bradley Rogers at (307) 684-1046.

cc: BLM, Field Manager, Buffalo Field Office, Buffalo, WY (D. Spencer)
FWS, Fish and Wildlife Biologist, Buffalo Field Office, Buffalo, WY (B. Rogers)
WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (M. Flanderka)
WGFD, Non-Game Coordinator, Lander, WY (B. Oakleaf)

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United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Reston, VA 20192

BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
2010 AUG 14 P 12: 46

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In Reply Refer To:
Mail Stop 423

AUG 0 6 2009

Ms. Sarah Bucklin
Bureau of Land Management
2987 Prospector Drive
Casper, WY 82604

Subject: Draft Environmental Impact Statement for the Wright Area of the Wyoming Powder River Basin

Dear Ms. Bucklin:

As requested by your correspondence of June 17, 2009, the U.S. Geological Survey (USGS) has reviewed the subject draft environmental impact statement (DEIS) and offers the following comment.

**SPECIFIC COMMENT**

**Section 3.5.1.2.1.2, West Jacobs Ranch LBA Tract, page 3-108, first full paragraph, first sentence; and page 3-110, first partial paragraph, last sentence**

The two sentences appear to contradict each other. The first states that "The extent of drawdown west of the mines that is specifically attributable to mine dewatering *can no longer be defined* due to much greater and areally extensive drawdown cause by CBNG development." [italics mine] Two pages later, the document states that "... WDEQ/LQD would require that future drawdown impacts due to mining alone be predicted..." The apparent contradiction may merely be a matter of semantics: drawdown due to mining can still be defined (by various methods such as mathematical modeling or analytical solutions). The accuracy of those estimates cannot be tested or observed in the real world, however, because in practice mine drawdown it is a relatively small impact that is masked by much larger drawdown due to CBNG development. The same apparent contradiction occurs in descriptions of other tracts in other parallel sections of the DEIS, such as the last sentence on page 3-112 compared with the first sentence on page 3-115.

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Thank you for the opportunity to review the DEIS. If you have any questions concerning our comment, please contact Lloyd Woosley, Chief of the USGS Environmental Affairs Program, at (703) 350-8797 or at lwoosley@usgs.gov.

Sincerely,

James F. Devine
Senior Advisor for Science Applications

# BLM Responses to Comment Letters Received Regarding the Wright Area Draft EIS

**Comment Response 1:** Please review Section 1.2; we have clearly stated the purpose and need of the EIS and the proposed action. Approximately 92 percent of the total coal that is mined in the U.S. is used for generating electricity. Currently, coal-fired electric generating plants are the cornerstone of the nation's central power configuration. Electricity is important to the country's security and economy. Many other states rely on Wyoming for coal reserves in view of the fact that Wyoming coal is used to generate electricity in 36 states.

We revised the Final EIS to include additional information regarding the projected electric generation portfolio of the United States. Please see Section 4.2.14.4. Studies have indicated that even with a considerably more optimistic projection for renewable sources, coal use continues to be projected as the largest portion of the domestic electric fuel mix until at least 2035.

As described in Section 4.2.14.4 of the EIS, the key determinant of energy consumption is population. The population in the U.S. has increased by about 20 percent and energy consumption by a comparable 18 percent since 1990, with variations in energy use per capita depending on factors such as weather and the economy. As human population and activities have increased, carbon-based fuels have been used to provide for these additional energy needs. To meet the nationwide consumer demand and requirement for energy, coal is burned in power plants to produce electricity. Many countries are even more reliant on coal for their energy needs than is the United States. As stated in the EIS, more than 70 percent of the electricity generated in China and India comes from coal.

As described throughout Chapter 1, the purpose of this EIS is to analyze and disclose the potential effects to the natural and human environment from the proposed leasing of six maintenance tracts of federal coal in the Wright Area of the Wyoming Powder River Basin. Although leasing these tracts would not authorize mining operations on those lands, the EIS evaluates the potential impacts of mining the tracts because mining is a logical consequence of issuing a lease for a maintenance tract of federal coal. The EIS presents BLM's analysis of environmental impacts under the authority of NEPA and associated rule and guidelines.

The BLM is a multiple use land management agency that also manages federal minerals, including federal coal reserves. BLM administers public lands and minerals under the policy and practice of multiple use management. The Bureau's responsibility for multiple use involves balancing an extensive diversity of resources and the potential use or development of those resources and lands as administered by BLM. Managing vast and varied resources under this mandate is a complex undertaking, particularly since the priorities set for one management activity may conflict with the priorities of another. For both BLM and FS administered public lands, the management, constraints, limitations, and prescriptions for those lands are developed through the land use planning process. The public is encouraged and invited to participate throughout those processes. The EIS identifies and explains that the proposed actions and alternatives are consistent with the BLM Buffalo Field Office and USFS land use plans.

**Comment Response 2:** Please review the BLM National Environmental Policy Act (NEPA) Handbook H-1790-1. As described in the handbook, proposed federal projects that are externally generated actions, like coal lease applications filed by a proponent, include the formulation of a range of alternatives encompassing denial of the request (No Action), approval of the request as proposed by the proponent, and approval of the request with modifications as made by BLM to the proponent's proposal. As exemplified in H-1790-1, the Wright Area EIS range of alternatives carry out the intent and spirit of NEPA.

For the alternatives and their descriptions, please see Chapter 2 in the EIS. This chapter contains the full range of alternatives in response to the coal lease applications there were submitted by the lease applicants. Chapter 2 describes the proposed action and a number of alternatives for each of the six lease by application (LBA) tracts being evaluated in this EIS.

Please review Section 2.7.1 for the new mine start alternative. As stated in the EIS, this alternative was not analyzed in detail because a new mine start is highly unlikely at this point in time for a number of reasons including initial capital expenses, mine startup costs, obtaining new permits, etc. Please review the EIS, all of these are clearly discussed and explained.

As explained in Section 2.7.2, the delaying the sale alternative was not analyzed in detail because it would not produce substantially different impacts from other alternatives already analyzed in detail. The environmental impacts of mining the coal later as part of an existing mine would be expected to be similar and about equal to the Proposed Action and Alternatives 2 and 3 for each LBA tract.

The EIS is not intended to be an environmental analysis of the numerous technologies that are capable of producing electricity. As stated throughout the Wright Area EIS, the EIS was prepared pursuant to the NEPA and other applicable regulations and statutes to address possible environmental and socioeconomic impacts that could result from the Wright Area coal lease applications.

As stated in Chapter 4, ongoing scientific research is working to identify the potential impacts of greenhouse gases (GHG) on global climate. Our analysis recognizes that the addition of non-carbon fueled electric generation sources could reduce future GHG emissions. Further, the addition of alternate sources of electric generation would potentially help to conserve carbon-based fuels and provide a broader portfolio of electric sources. However, the environmental effects and impacts associated with the wide variety of renewable electric generation technologies are well beyond the scope of this EIS. Individual projects associated with alternative electric generation technologies would be evaluated separately under their own NEPA process as each project is proposed and would be analyzed on their own merit. In order for an alternative energy project to come to fruition, there must first be a valid proponent to propose, support, and fund the project.

**Comment Response 3:** The BLM does not permit, nor authorize, mining operations and does not have the authority to regulate mining activities nor mitigate air quality impacts. As discussed in detail in Section 1.3 of the EIS, WDEQ is authorized by the Secretary of the Interior to

regulate surface coal mining operations and surface effects of mining on federal and non-federal lands within Wyoming.

Air pollution is controlled by state and federal air quality regulations and standards established under the federal Clean Air Act Amendments administered by EPA. The National Ambient Air Quality Standards (NAAQS) were established by EPA under the authority of the Clean Air Act (CAA). The Wyoming Ambient Air Quality Standard (WAAQS) for the $PM_{10}$ annual, the $SO_2$ annual, and 24-hour levels are more stringent than the National Ambient Air Quality Standard (NAAQS) and are enforced by WDEQ/AQD. State implementation plans are in place to ensure that proposed actions like coal mining comply with all associated air quality regulations and criteria.

As disclosed in the EIS, large surface coal mines in the PRB have the potential to become particulate emission sources contributing to air quality degradation. As stated in Section 3.4.2.3 of the EIS, the WDEQ/AQD requires the Wyoming Powder River Basin mines to collect air quality data. The eastern Powder River Basin is one of the most intensely monitored areas in the world for air quality. As explained throughout the EIS, WDEQ/AQD has, by statute, the authority and responsibility to require mitigation for air quality impacts.

WDEQ/AQD issues permits to mine coal under the authority delegated to them by the EPA under the CAA. In Wyoming, mines in the PRB are permitted under the CAA as regulated emission sources. Permits issued by the WDEQ identify mitigation measures that the permittee must implement in order to comply with the permit. These measures, currently in place at the Wright Area mines and typically in place at other PRB mines, are described in Section 3.4.2 of the EIS. WDEQ/AQD is authorized to condition permits as necessary for mitigation. WDEQ/AQD will not permit activity that is out of compliance with the WAAQS.

Ozone is included in the EIS discussion regarding $NO_X$ emissions since $NO_X$ is one of the main components involved in the formation of ground level ozone. As previously discussed, EPA is the agency chiefly responsible for national air quality regulations and authorities concerning ozone, $CO_2$, and the development of national standards. BLM does not govern air quality standards and does not issue air quality permits.

The EIS evaluates the Prevention of Significant Deterioration (PSD) and it is addressed in Chapter 3 and 4. Section 169 of the Clean Air Act addresses visibility protection. On June 15, 2005, EPA issued final amendments to its July 1999 Regional Haze Rule. These amendments apply to the provisions of the rule and require emission controls known as Best Available Retrofit Technology, or BART, for industrial facilities emitting air pollutants that reduce visibility. As explained in the EIS, the nearest Class I PSD areas to the general analysis area for this EIS are Wind Cave National Park (about 100 miles east) and the Badlands Wilderness Area (about 150 miles east).

The EIS has been revised to include additional information regarding air quality data and visibility monitoring. Please see Section 3.4.4.1.1, 3.4.4.1.2, 3.4.4.1.3, Table 3-12, Figure 3-19, and Section 4.2.3 for analyses regarding air quality, visibility, the Regional Haze Rule, and AQRVs. The EIS clarifies that the cumulative air quality modeling did not separate PSD

increment-consuming sources from those that did consume increment. The modeling was designed to include both known and predicted sources, regardless of regulatory status. Again, BLM has no jurisdiction over the air quality permitting process.

For questions or concerns related to permitting procedures in Wyoming, please contact WDEQ, the governing agency of the coal mine permit process.

**Comment Response 4:** Please refer to Section 3.3.2.1.2 in the EIS regarding methane, or CBNG. BLM recognizes that CBNG is a valuable energy resource and BLM policy encourages the development of this resource, where economically feasible, in advance of coal mining. The analysis in the EIS clarifies that CBNG has been commercially produced in the PRB since 1989. The EIS discloses the release of methane as a result of mining, and that coal seams were already substantially depleted of CBNG in the vicinity of the mines in 2000. By 2005, drilling activity in the areas adjacent to the coal mines declined significantly. There has been little recent interest in drilling CBNG in this area.

The climate change and global warming analysis in Section 4.2.14.1 of the EIS identifies methane as a greenhouse gas (GHG) emission. The EIS describes the potential release of methane, both as a direct result of mining and the cumulative release of methane from activities in the PRB. Section 3.18.2 of the EIS contains estimates of GHG emissions resulting from specific mine operations at the three applicant mines as projected under the proposed actions and alternatives over the life of the actions. The estimates reflect mining and oil and gas activity based on national data scaled to activity in the PRB region.

Surface mines release methane to the atmosphere as the coal is exposed and loaded in small diluted volumes. Flaring is not feasible with surface mining operations since flaring requires the gas to be concentrated in quantities sufficient to burn, as might be possible in an underground mine. We did recognize that large volumes of methane have been put to beneficial use as a result of CBNG (coalbed natural gas) recovery in advance of mining, and that by the time the coal is mined, methane in commercial quantities has been depleted.

**Comment Response 5:** The information provided in your comment has been considered in the preparation of the EIS. Please review our analyses and disclosure of impacts regarding greenhouse gas emissions, global warming, climate change, cumulative effects of combustion of PRB coal by power plants, and current and future energy sources and emissions of greenhouse gases in Section 4.2.14.1, 4.2.14.2, and 4.2.14.4.

Also, please see Section 4.2.14.3 in the EIS. It addresses U.S. actions and strategies regarding GHG emissions. Potential regulatory policies to address climate change are in various stages of development at the federal, state, and regional levels. EPA is the agency chiefly responsible for the Clean Air Act and its implementation including the governing of GHG emissions as air pollutants. EPA is the agency with the authority to regulate GHG emissions from power plants and factories, not BLM. BLM does not regulate GHG emissions, nor set national standards for carbon fuel use.

BLM does not govern air quality standards and pollutants. Further, BLM does not permit, nor authorize, mining operations and does not have the authority to regulate mining operations. As discussed in detail in Section 1.3 of the EIS, WDEQ is authorized by the Secretary of the Interior to regulate and permit surface coal mining operations.

Your comment suggests that the EIS should examine a wide variety of "mitigation alternatives" with the only connection being that all the actions would, in theory, fall under the jurisdiction of an assortment of agencies within the Department of Interior. Your suggested approach fails to recognize that each project proposal is a federal action in its own right and must be evaluated in light of the effects of that action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or proponent undertakes such other actions.

The EIS addresses the environmental effects of leasing coal and the logical result that coal would be mined by adjacent operating mines. The EIS further discloses indirect emissions with the assumption that the coal will be mined and burned to produce electricity. It is beyond the scope of this EIS to analyze potential national and international regulations regarding GHGs and carbon fuel use.

**Comment Response 6:** Please review Section 4.2.14.1 in the EIS; it clearly describes and discusses GHGs and climate change at depth including the observed and projected effects of global warming, sea level changes, differential temperature changes, and changes to vegetation and habitat. We referenced the Intergovernmental Panel on Climate Change (IPCC) assessment throughout the cumulative impacts analysis.

As disclosed throughout the EIS, when coal is burned and used as a primary source for generating electricity, it results in the release of $CO_2$, a greenhouse gas (GHG). A large portion of our country's existing domestic electric generating capacity is based upon carbon-based fuels, as described in the EIS. The potential impacts of climate change represent the cumulative aggregation of worldwide GHG emissions. As noted in the EIS, many countries are even more reliant on coal for their energy needs than is the United States. More than 70 percent of the electricity generated in China and India comes from coal. Many foreign countries do not have an EPA to regulate air pollution or control emissions.

The EIS provides a meaningful context and measure of the relative significance of coal use from the proposed LBAs and overall projected PRB coal production on total GHG emissions, and the EIS recognizes the effects of historic warming on the western U.S. Please see Chapter 4 to review the complete cumulative impacts analysis. BLM analyzed the cumulative impact on the environment that results from the incremental impact of the proposed LBAs when added to other past, present, and reasonably foreseeable future actions, including GHG emissions.

Please see Section 4.2.14.2 of the EIS for our analysis regarding the cumulative effects of combustion of PRB coal by power plants. We included 1) annual $CO_2$ emission estimates based on PRB coal production levels, 2) annual $CO_2$ equivalents ($CO_2e$) emission estimates from coal production at all PRB mines with pending LBAs, and 3) estimated $CO_2$ emissions produced from

the combustion of coal produced from the Wright Area EIS coal tracts. As described in the EIS, we assumed that coal mining would proceed in accordance with permit conditions. We further assumed that this coal would be sold to consumers in response to forecasts of coal demand. Historically, the consumers have been the domestic electric utility companies although there is potential for sales outside the U.S. The coal market is open and competitive; consumers are free to choose and buy from the most cost effective suppliers in order to meet their needs.

As previously noted, in Chapter 4, we estimated the amount of GHG emissions that could be attributed to coal production as a result of leasing the proposed LBAs, as well as from the forecast coal production from all coal mines in the Wyoming PRB. Again, we assumed that all PRB coal would be used for coal-fired electric power generation. This gives an upper estimate of GHG emissions resulting from use of the coal that would be produced from the proposed LBAs and for forecast total PRB coal production. The estimate was derived by relating the portion of coal produced in the Wyoming PRB to national steam coal totals, and then applying that ratio to the total emission of GHG estimated in the U.S. as a result of coal-fired electric generation.

We have assumed that existing land and resource conditions within the analysis area have been and will continue to be affected by climate change under all alternatives including the No Action Alternative. Existing climate prediction models are not at a scale sufficient to estimate potential impacts of climate change within each analysis area. We have referenced national and regional data that is available including "The Effects of Climate Change on Agriculture, Land Resources, Water Resources and Biodiversity in the United States" (U.S. Climate Change Science Program, 2008).

An additional June 2009 report defined the relative degree of climate change effects that could potentially be experienced in the future in various regions of the United States (Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.), Cambridge University Press). The report uses two scenarios to bracket potential climate effects and separates the country into regions. The Wyoming Powder River Basin is included in the Great Plains region, which is characterized by strong seasonal climate variations. Historically, the area has been subject to prolonged drought followed by wetter conditions. Average temperature increases have been predicted in the region with the greatest changes being in the winter such that commonly very cold days would become less common and warmer wetter weather would be more common.

Under the higher heat trapping emissions scenario, temperatures are projected to increase over the next 100 years more so than under the lower heat trapping emissions scenario. The milder winters and longer growing season would be expected to favor larger numbers of insects earlier and longer into the season. The change in climate is expected to cause a shift in wild plant and animal distributions favoring those species that are better suited for the warmer wetter climates that both the lower emission and higher emission scenarios predict for the Powder River Basin. With increasing precipitation, soil erosion in drainages and sheet flow across the land surface would be expected to increase, based on assumptions.

Please see Section 3.18.2 for our site-specific analysis regarding GHG emissions. It contains estimates of GHG emissions resulting from the combined mine operations. The site-specific impacts analyzed in this EIS are based on the assumption that if an LBA tract is offered for competitive lease, a lease would be issued and mining would be permitted. We further assume that the applicant would be the lessee, and the lease would be permitted as an extension of their current mining operations. As described in Chapter 3, we estimated the change to GHG emissions under each alternative LBA configuration, including the No Action Alternative. The EIS estimates direct emissions of GHGs as a result of continued operations of the applicant mines and the proposed leasing actions. The EIS also estimates potential GHG volumes resulting from the assumed use of this coal at dispersed electric generation facilities.

As previously described, the EIS is addressing the environmental effects of leasing federal coal and the potential mining of that coal. The EIS further discloses the indirect emissions on the presumption that the coal will potentially be mined and burned to produce electricity. The EIS does not attempt to estimate the cost of GHG emissions from coal combustion at utility power plants. The EIS does not assert that the cost of GHG is zero or any particular value, as there is no known threshold or context for this value. In a regulatory structure where GHG control costs factor into electric generation costs, coal users would likely weigh these costs into capital and operating decisions. Electric generation activity is directly influenced by consumer demand. If electricity cannot be supplied to meet demand, power prices rise until the demand falls. Measures to reduce GHG emissions from coal burning are applicable at the place where the coal is consumed because the coal consumer must comply with regulatory and price constraints, and this will bear on fuel choices. Infrastructure, equipment availability, incentives, and cost also determine the potential for switching to non-carbon based electric generation. Mining the lease reserves and the continued operation of a Powder River Basin mine is not directly tied to any existing or proposed electric generation facility. Limiting one or even several points of fuel supply will not affect coal use because of the diverse group of national and international suppliers.

Finally, please review Section 4.2.14.3, which describes U.S. actions and strategies to address GHG emissions. As stated in the EIS, national policies regulating specific levels of significance have not yet been established for GHG emissions. Given the state of the science, it is not possible to associate specific actions with specific global impacts such as potential climate effects. Since there are no tools available to quantify incremental climate changes associated with these GHG emissions, the analysis cannot reach conclusions as to the extent or significance of the emissions on global climate.

As described throughout the EIS, BLM does not govern GHG emissions, air quality standards, nor pollutants. Further, BLM does not permit nor authorize mining operations and does not have the authority to regulate mining operations or the burning of coal at utility plants. The Clean Air Act requires the EPA to regulate air pollutants and develop regulations, rules, and standards for industries that emit one or more pollutants in significant quantities.

BLM has considered and addressed climate change comments that we received in a timely manner pertaining to this EIS. They are also included in our administrative record.

**Comment Response 7:** We have revised Section 3.11 in the Final EIS to include additional information regarding the loss of access to public lands. In general, if the LBAs are leased, the loss of access to federally administered public lands in the LBAs may extend for 20 years or more after permitting depending on individual mine plans, mine variation in coal production rates, permitting requirements, and reclamation sequence and succession. Also, please see Chapter 2. It describes and discloses in detail the length of time that would be required to recover the federal coal from each LBA. Please see Comment Response #9 for additional information regarding reclamation.

The BLM is a multiple use land management agency that also administers federal minerals, including federal coal reserves. BLM administers public lands and minerals under the policy and practice of multiple use management. The Bureau's responsibility for multiple use involves balancing an extensive diversity of resources and the potential use or development of those resources and lands as administered by BLM. Managing vast and varied resources under this mandate is a complex undertaking, particularly since the priorities set for one management activity may conflict with the priorities of another. For both BLM and FS administered public lands, the management, constraints, limitations, and prescriptions for those lands are developed through the land use planning process. The public is encouraged and invited to participate throughout the land use planning processes. The EIS identifies and explains that the proposed actions and alternatives are consistent with the BLM Buffalo Field Office and USFS land use plans.

As described in the EIS, for the lands included in the Wright Area LBAs and affiliated study areas, there are, in fact, no BLM administered surface lands. BLM does not control nor manage private surface ownership lands. Those rights and authorizations belong to the private surface land owners. As shown in Table 3-15 in the EIS, private surface ownership makes up 65.1 percent of the total acreage included in BLM's preferred alternatives. BLM will not lease coal under private lands without the consent of the qualified surface owner (43 CFR 3400.0-5(gg)).

As also indicated in Table 3-15, approximately 12,481 acres of federal surface administered by the USFS are included in the Wright Area LBA tracts under BLM's preferred alternative. As described in Section 1.6, USFS is a cooperating agency on this EIS and must consent to leasing the federal coal underlying lands that they administer before BLM can include those lands in a decision to hold a federal coal lease sale. The USFS will issue their own separate record of decision (ROD) regarding their potential consent to lease those lands. A decision to consent to lease USFS lands can be appealed within 45 days from the date that the Notice of Publication of USFS ROD is published in the Laramie Boomerang.

If USFS administered public lands are leased for coal, at the mine permit stage, USFS would include stipulations related to allowing access to TBNG lands included in existing federal coal leases. USFS does not necessarily allow the mines to close access to all public lands within the permit boundary. For human health and safety reasons, access can be closed in the areas that are currently being actively mined. The mines can officially only deny public access to National Forest System lands included in federal coal leases that are within the "active area fence" for each mine. If the mines remove publicly accessible roads from public access, they must provide alternate publicly accessible roads in that area.

The TBNG is a mixture of public and private surface lands. In some cases, USFS lands are isolated parcels surrounded by private lands that are not easily accessible to the public. Federal land exchanges can be used as a tool to help facilitate the creation of more contiguous blocks of National Forest System land, can make state land more accessible and usable to the general public, and can decrease conflicts related to crossing private land to reach public land.

From 1993 through 2000, the USFS Douglas Ranger District completed 21 land exchanges involving more than 69,000 federal acres. In exchange for these federal lands, the USFS acquired more than 46,000 acres, eliminated 12 private inholdings within federal lands, eliminated 71 isolated parcels of public lands, and gained 426.8 acres of wetlands.

From 2000 through 2010, the USFS Douglas Ranger District completed two land exchanges involving more than 5,199 federal acres. In exchange for these federal lands, the USFS acquired more than 4,918 acres, eliminated three private inholdings within federal lands, eliminated three isolated parcels of public lands, and gained 0.3 acres of wetlands.

**Comment Response 8:** Please see Section 3.3.2, 3.11.1, and 3.15 of the EIS. Impacts to ancillary facilities that support oil and gas production in the area are addressed in detail in those sections. The EIS identifies and discloses that, in order for coal to be mined, oil and gas development must be curtailed and development facilities and equipment must be removed prior to mining operations. As stated in Section 3.15, the pipeline owner/operator and the coal mine operator must come to agreement before any disruption, relocation or abandonment of these pipelines would occur.

For more information, please also see Section 4.1.12, 4.5.11, and Appendix D. Appendix D lists the stipulations that are included on coal leases in the Powder River Basin. These stipulations specifically address multiple mineral development and oil and gas/coal resources.

**Comment Response 9:** As described in the EIS, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) is the federal law that regulates surface coal mining. BLM has no authority under SMCRA. BLM does not regulate or enforce reclamation of mined lands in Wyoming. The Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD) regulates and monitors reclamation. Reclamation laws for coal mining in Wyoming originate from the State of Wyoming's Open Cut Reclamation Act of 1969 and the Wyoming State Environmental Quality Act of 1973, as well as from SMCRA, the federal act. These three acts together regulate coal mining.

The State of Wyoming has the overall reclamation authority and enforces the federal and state acts through the WDEQ. Within the federal coal leasing program, BLM only has the authority to make decisions regarding the potential leasing of federal coal resources. BLM does not authorize surface disturbance or permit mining operations, nor administer reclamation activities. The Office of Surface Mining Reclamation and Enforcement (OSM) and the WDEQ/Land Quality Division (LQD) are the reclamation authorities.

Long term reclamation information is provided in Section 4.1.1.1 in the EIS and includes tables that provide detailed reviews and projections of actual and projected disturbance and reclamation in the Wright subregion. This review reflects the total disturbance, including active mining and mined but unreclaimed, as well as disturbed but unavailable for reclamation due to occupation by long term structures or facilities. Please note that permanently reclaimed areas are also included in the analysis.

In particular, Table 4-2 and 4-3 in Chapter 4 of the Final EIS summarize a detailed review and projection of actual and projected disturbance and reclamation acreages through the year 2020. This review reflects the total disturbance area (including the active mining area, the unreclaimed mined area, and the area disturbed but unavailable for reclamation due to being occupied by long-term structures or facilities), as well as areas permanently reclaimed. The trend is that the acreage including active mining and mined but unreclaimed is expected to increase slowly, less than 1 percent per year, as is the acreage of land disturbed but unavailable for reclamation. The rate of permanent reclamation will be more rapid, about 4 percent per year. The ratio of total land reclamation to total land disturbance was around 30 percent in 2003, and is expected to be 45 percent by 2010, and approaching 60 percent by 2020. As of 2008, the actual ratio of total land reclamation to total land disturbance was about 38 percent (15,800 acres permanently reclaimed out of a total mine disturbance area of 41,700 acres) for the Wyoming PRB mines. Of the total unreclaimed disturbance, about 12,000 acres were unavailable for reclamation and 14,000 acres were in active mining operations. An accounting of acres disturbed to acres reclaimed for the three applicant mines in 2008 is also discussed in Chapter 3 of the EIS.

During the permitting process, the mines submit reclamation plans to WDEQ for approval. These plans are based on the individual mining company's mining progression. The WDEQ approves or rejects these plans based on the mining progression of the individual mine and the area needed for long-term facilities, sedimentation reservoirs, haul roads, diversions, and topsoil stockpiles. The reclamation plan is evaluated against the individual mine progression by the WDEQ to ensure reclamation is directly following the mining extraction process.

WDEQ has strict parameters for coal mine reclamation procedures, species compositions, final land surface contour, and environmental sustainability. SMCRA requires sufficient bonding to cover anticipated reclamation costs. When mining is permitted, WDEQ/LQD sets the bond amount for reclamation of all disturbed lands and the operator posts an acceptable bonding instrument for this amount with the State of Wyoming. The reclamation bond is not released until a minimum of ten years have elapsed from the date of final seeding and the WDEQ/LQD has determined that all reclamation verifications have occurred. Regardless of their bond release status, reclaimed lands are frequently utilized, and are often preferred, by wildlife and are commonly used for livestock grazing.

On a monthly basis, WDEQ/LQD monitors all lands within the mining permit boundary. These lands must pass requirements set by state law. Until the mines terminate their permit, the WDEQ does not require them to complete final bond release as long as contemporaneous reclamation is proceeding at the required rate and to the required standards as regulated by state and federal laws. Please note that there are several phases of bond release that mines may apply for that represents every task from replacing the backfill, to the approved contour, to placing topsoil and

permanent seeding. Therefore, a percentage assessment of lands that have been released from final bonding requirements is not an accurate assessment of "contemporaneous" reclamation.

As previously mentioned, during the interim period between initial reclamation and final bond release, land condition and status is monitored by WDEQ/LQD, and that information is publically available at their Cheyenne office. Individual coal mine annual reports are also available to the public at WDEQ/LQD offices and include additional reclamation information. OSM also prepares reports describing reclamation activities in Wyoming. Please contact their offices for further information regarding reclamation.

**Comment Response 10:** The EIS includes a thorough evaluation of water resources in Section 3.5, 4.2.4, and 4.2.5. Please review these sections, and in particular, see Section 4.2.4 for the groundwater cumulative impact analysis, which includes coalbed methane/natural gas development. As noted throughout the EIS, SMCRA and Wyoming state law require that the surface coal mine operator provide the owner of the affected water right with water of equivalent quantity and quality.

There are a number of specific studies under SMCRA and Wyoming law that would be done and would bear on the approval of a permit to mine any Wright Area LBA lands that might be leased. Once the mining plan has been developed, the mine would then submit a mine permit application to WDEQ. A Cumulative Hydrologic Impact Assessment (CHIA) would then be developed by the WDEQ/LQD to examine how the mining of the LBA, along with any other already approved mining, would affect groundwater. The CHIA considers recharge contribution and a system of wells to monitor groundwater would also be specified at that time. The management of surface water flows during mining, as well as the restoration of surface water flow systems post mining, is specified in each mining permit. CHIAs are available for the public to review at the WDEQ/LQD.

The cumulative water modeling study, completed by BLM in December 2009 as part of the Powder River Basin Coal Review, provides additional information on surface and groundwater resources and effects by regional development activities. To review the report, please access the following link:
http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html

For the purposes of identifying and disclosing potential impacts, the EIS assumes that: 1) each LBA is offered for lease, 2) that the successful lessee is the applicant mine, and 3) that the mine applies for, and is granted, a permit to mine the LBA in a manner similar to the mining that is already permitted on other lands at the applicant mine.

**Comment Response 11:** If the decision is made to offer an LBA for lease and hold a coal sale, prior to proceeding with any lease offer as a result of processing the Wright Area LBAs, BLM will ensure that the provisions of the Mineral Leasing Act and the Federal Coal Leasing Amendments are complied with. A lease cannot be issued to any entity that would result in that

entity exceeding the acreage limitations. As described in Section 1.6 of the EIS, the Department of Justice will be consulted prior to the issuance of a lease.

**Comment Response 12:** The Wright Area EIS wildlife surveys were carried out in accordance with established agency guidelines and protocols. BLM prepared and provided the Wright Area EIS, Biological Evaluation, and Biological Assessment to USFWS, USFS, and the Wyoming Game and Fish Department for their review. BLM has improved and revised the wildlife analyses in the FEIS based on comments received from the professional wildlife biologists at these agencies.

Please see Section 3.10.5.1 in the EIS for the sage-grouse analysis. The sage-grouse is designated as a BLM Sensitive Species and as a USFS Region 2 Sensitive Species and Management Indicator Species, as additionally analyzed and described in detail in Appendix H. On March 5, 2010, the Service announced its decision to add the Greater sage-grouse to the list of Candidate species under the ESA. USFWS found that listing the Greater sage-grouse was warranted but precluded by higher priority listing actions. BLM identifies Greater sage-grouse as a Candidate species in the EIS.

The U.S. Fish and Wildlife Service (USFWS) is responsible for the administration of the Endangered Species Act. USFWS is the lead agency that manages threatened and endangered species and, through the Section 7 process, consults with other agencies in how proposed projects may impact and affect listed species. All federal agencies have a responsibility under Section 7(a)(1) of the Endangered Species Act to conserve federally listed threatened and endangered species. BLM is partnered with USFWS in fulfilling our Section 7 consultation obligations and responsibilities. We continue to work with USFWS in order to address concerns and provide any additional information needs. Section 7 consultation will be completed before a decision is made on the Wright Area EIS proposed coal leases.

As explained in the EIS, Wyoming has been exceptionally proactive in the management and conservation of its Greater sage-grouse. In 2007, Wyoming Governor Dave Freudenthal commissioned a Statewide Sage-grouse Implementation Team (SGIT), which emerged from the Governor's 2007 Sage-grouse Summit. On March 17, 2008, the Implementation Team preliminarily identified and mapped recommended sage-grouse core breeding areas in Wyoming in an effort to better understand what types of habitat the grouse prefer and what areas should be protected. The Core Population Strategy for the state of Wyoming is designed to maintain habitats and viable populations of sage-grouse in areas where they are most abundant. SGIT delineated approximately 40 areas around the state with the objectives of maintenance and enhancement of sage-grouse habitats and populations within those focal areas. The polygons were delineated by evaluating habitats within a four mile radius of selected sage-grouse leks in high lek-density areas. The SGIT continues to refine the delineated core population areas based on updated information and consultation with state and federal agencies.

On August 1, 2008, the Governor of Wyoming issued an executive order regarding sage-grouse core area protection. According to the executive order, state agencies are directed to work with federal agencies and landowners to maintain and enhance sage-grouse habitats and populations. The BLM Wyoming State Office is in the process of developing a statewide sage-grouse

management policy and has incorporated sage-grouse focus areas based on the core population area concept in the draft management policy.

None of the lands analyzed in the Wright Area EIS are located within the designated sage-grouse core population areas as mapped and identified by Wyoming's SGIT. Additionally, none of the lands evaluated in the EIS are within any of BLM's sage-grouse management focus areas.

Requirements to protect wildlife during mining operations are addressed as part of the existing mining and reclamation plan for each individual mine. BLM has no authority over these plans. If an LBA is leased and mined, the coal company, in concert with the USFWS, will develop a USFWS-approved mitigation plan to address and mitigate wildlife issues, including sage-grouse, before any surface disturbing activities can occur. Administered by WDEQ, requirements would be stipulated in the mining and reclamation plan amendments if the tract is leased, and before the tract would be mined.

Finally, WDEQ has strict parameters for coal mine reclamation procedures, species compositions, final land surface contour, and environmental sustainability. SMCRA requires sufficient bonding to cover anticipated reclamation costs. When mining is permitted, WDEQ/LQD sets the bond amount for reclamation of all disturbed lands and the operator posts an acceptable bonding instrument for this amount with the State of Wyoming. The reclamation bond is not released until a minimum of ten years have elapsed from the date of final seeding and the WDEQ/LQD has determined that all reclamation verifications have occurred. Regardless of the bond release status, reclaimed lands are frequently utilized, and are often preferred, by wildlife.

**Comment Response 13:** The USFWS is responsible for the administration of the Endangered Species Act. It is the mandate and responsibility of the Service to provide guidance to federal agencies in how to avoid adverse impacts to protected species and habitats. USFWS is currently monitoring trust resources to see how they are affected by changing climate. The USFWS Endangered Species Program is working to develop interim guidance regarding relevant aspects of ESA implementation involving climate change with a focus on how to evaluate and include the best available scientific information on climate change in the decision making process.

BLM prepared and provided the Wright Area EIS wildlife analyses, Biological Evaluation, and Biological Assessment to USFWS, USFS, and the Wyoming Game and Fish Department for their review. BLM has improved and revised the wildlife analyses in the FEIS based on comments received from professional wildlife biologists at these agencies.

Through the Section 7 process, the Service consults with agencies in how proposed projects may impact and affect listed species. All federal agencies have a responsibility under Section 7(a)(1) of the Endangered Species Act to conserve federally listed threatened and endangered species. BLM is partnered with USFWS in fulfilling our Section 7 consultation obligations and responsibilities. BLM will continue to coordinate and consult with USFWS on listed species and will work to ensure that our projects do not adversely affect nor jeopardize threatened and endangered species. Section 7 consultation will be completed before a decision is made on the Wright Area EIS proposed coal leases.

Section 4.2.14.1 in the EIS describes and discusses GHG and climate change at depth including the observed and projected effects of global warming. Section 4.2.14.3 in the EIS addresses U.S. actions and strategies regarding GHG emissions. Potential regulatory policies to address climate change are in various stages of development at the federal, state, and regional levels. EPA is the agency chiefly responsible for the Clean Air Act and its implementation including the governing of GHG emissions as air pollutants. EPA is the agency with the authority to regulate GHG emissions from power plants and factories, not BLM. BLM does not regulate GHG emissions, nor set national standards for carbon fuel use. It is very likely that various GHG emission limits will be established, enacted, and regulated by EPA in the future. As explained in the EIS, coal-fired power plants would have to comply with any new EPA standards, rules, or regulations for emission controls. Regulatory limits on emissions by coal-fired power plants have been and will likely continue to be enacted by EPA in the future.

Again, BLM does not govern GHG emissions, air quality standards, pollutants, nor air quality mitigation. Further, BLM does not permit, nor authorize, mining operations and does not have the authority to regulate mining operations nor the burning of coal. The Clean Air Act requires the EPA to regulate air pollutants, and they are required to develop regulations, rules, and standards for industries that emit one or more pollutants in significant quantities.

**Comment Response 14:** As directly stated by Secretary Salazar, "The fact remains that oil and gas and coal are a very important part of our energy portfolio now and they will continue to be an important part of our energy portfolio in the future . . . Fossil fuels and clean technology coal will have to be part of the mix if the U.S. is able to have enough energy in the future." Secretary Salazar also stated, "I don't want you all here to be scared, those of you here who are supportive of coal and oil and natural gas. At the end of the day, if we are going to be an energy independent nation, it's going to take all of us and all of you in coal and oil and those of us who want to harness the wind—all of us." His speech is available at: http://www.farmandranchguide.com/articles/2009/11/18/ag_news/regional_news/news2.txt

As stated in the EIS, approximately 92 percent of the total coal that is mined in the U.S. is used for generating electricity. Currently, coal-fired electric generating plants are the cornerstone of the nation's central power configuration. Electricity is important to the country's security and economy. Many other states rely on Wyoming for coal reserves in view of the fact that Wyoming coal is used to generate electricity in 36 states.

As described in Section 4.2.14.4 of the EIS, the key determinant of energy consumption is population. The population in the U.S. has increased by about 20 percent and energy consumption by a comparable 18 percent since 1990, with variations in energy use per capita depending on factors such as weather and the economy. As human population and activities have increased, carbon-based fuels have been used to provide for these additional energy needs. To meet the nationwide consumer demand and ever-growing requirement for energy, coal is burned in power plants to produce electricity.

We revised the Final EIS to include additional information regarding the projected electric generation portfolio of the United States. Please see Section 4.2.14.4. Studies have indicated

that even with a considerably more optimistic projection for renewable sources, coal use continues to be projected as the largest portion of the domestic electric fuel mix until at least 2035. Other energy sources for electric power have been and continue to be developed, but not to the extent that they can instantaneously replace coal as a fuel for electrical generation. At this time, there is not enough alternative energy sources developed and in place to fill the gap that would be left if coal was removed as a fuel source for electrical generation in the U.S.

America's electrical power demand results from electric use decisions made by individuals and businesses. The coal market is open and competitive; consumers are free to choose and buy from the most cost effective suppliers in order to meet their needs. BLM leases federal coal to private coal companies that develop and supply coal primarily as a fuel for electric utility companies to generate electricity in response to the electric demand of the American people. BLM recognizes that coal leasing demand is a direct indication of electric generation activity, which in turn is directly influenced by consumer demand. If the demand for coal decreases nationwide, then coal production and coal mining would decrease.

A Record of Decision (ROD) shall be issued for each LBA addressed in this EIS. In the ROD, BLM will reach a decision as to whether to reject the LBA or competitively offer a federal coal tract in response to the LBA. The ROD will address public interest considerations made in the decision.

As described throughout Chapter 1, the purpose of this EIS is to analyze and disclose the potential environmental impacts and effects from the proposed leasing of six maintenance tracts of federal coal in the Wright Area of the Wyoming Powder River Basin. Although leasing these tracts would not authorize mining operations on those lands, the EIS evaluates the potential impacts of mining the tracts because mining is a logical consequence of issuing a lease for a maintenance tract of federal coal. Please see Section 3.19 in the EIS for the analysis regarding irreversible and irretrievable commitments of resources.

The BLM is a multiple use land management agency that also administers federal coal leasing and the management of other federal minerals. BLM does not solicit, importune, nor seek out project proposals regarding coal, uranium, oil, gas, wind, solar, or any other energy-type resource. Rather, an applicant, lease holder, and/or company will propose a project or submit an application to BLM if their proposed action includes BLM-administered public lands and/or federal minerals. BLM manages these actions and proposals through leases and rights-of-way where public lands and/or minerals are concerned. Again, applicants, lease holders, and companies are the ones that propose development projects to BLM, not the other way around.

Wind power and other alternative energy development projects potentially depend on available transmission capacity to link the project sites to the national grid. There are a number of high wind potential areas in Wyoming where the transmission infrastructure and powerline capacity is being enhanced and expanded in order to support wind power development. Of special note, BLM has an active renewable energy program and has recently created the Wyoming BLM Renewable Energy Coordination Office to facilitate the processing of renewable energy projects.

In order for an alternative energy project or any other project to come to fruition, as previously explained, there must first be a valid proponent to plan, develop, and propose the project to BLM, i.e. applicant, lessee, or company. As with any project, alternative energy projects would be evaluated separately under their own National Environmental Policy Act (NEPA) process. Each proposed project would be analyzed independently, on its own merit.

BLM is a land management agency and, as such, does not have the means to develop "clean coal" technologies. However, the mission of the Department of Energy (DOE) is to promote America's energy security through reliable, clean, and affordable energy. As noted by the DOE's Office of Fossil Energy, fossil fuels supply 85 percent of the nation's energy and, therefore, they are charged with researching and developing a number of high priority projects including pollution-free coal plants, carbon capture and sequestration, coal gasification, and new combustion turbine technology. For further information, please review their website at: http://fossil.energy.gov/programs/powersystems/index.html

As described throughout the EIS, BLM does not govern GHG emissions, air quality standards, nor pollutants. Further, BLM does not permit, nor authorize, mining operations and does not have the authority to regulate mining operations or the burning of coal. The Clean Air Act requires the EPA to regulate air pollutants and develop regulations, rules, and standards for industries that emit one or more pollutants in significant quantities.

**Comment Response 15:** Carbon sequestration is addressed in Section 4.1.1.2.5, 4.2.14.3, and 4.2.14.4 of the EIS.

**Comment Response 16:** Please see Section 4.2.14.5 in the EIS for the analysis regarding combustion by-products. Black carbon is a general term applied to various carbonaceous products that have not completely combusted. The WDEQ/AQD monitors and regulates coal combustion facilities in Wyoming. WDEQ enforces regulations on particulate emissions from coal combustion facilities at or above the standards set by the EPA. The Clean Air Act requires the EPA to regulate air pollutants and develop regulations, rules, and standards for industries that emit one or more pollutants in significant quantities.

**Comment Response 17:** Please review Section 4.2.14.1 in the EIS; it clearly describes and discusses GHG and climate change at depth including the observed and projected effects of global warming, sea level changes, differential temperature changes, and changes to vegetation and habitat.

Local human health impacts from mining in the PRB are described in Section 3.18.1.1 in the EIS. However, the tools necessary to effectively quantify the effects on global human health due to increased $CO_2$ levels from a specific activity, like the mining of an LBA tract in Wyoming and the combustion of that particular source of coal, are not currently available.

**Comment Response 18:** Please review Section 4.2.14.1 in the EIS; it clearly describes and discusses GHG and climate change at depth including the observed and projected effects of global warming, sea level changes, differential temperature changes, and changes to vegetation and habitat.

The tools necessary to quantify incremental effects on oceans due to increased $CO_2$ levels for specific activities, like the mining of an LBA tract, are not available. Consequently, impact assessment of effects of specific anthropogenic activities cannot be performed. Additionally, specific levels of significance have not yet been established. Therefore, potential global analysis of ocean acidification in this EIS is limited to accounting and disclosing factors that contribute to GHG levels. To the extent that emission data were available or could be inferred from representative type data, we have identified potential GHG emissions that could result from the development of a proposed LBA, as well as emissions that could result from selection of the No Action Alternative.

**Comment Response 19:** Ozone has been included in discussions on emissions of nitrogen oxide, $NO_X$, since it is one of the main components involved in the formation of ground level ozone. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents as well as natural sources emit $NO_X$ and volatile organic compounds (VOC) that help to form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather can cause ground level ozone to form in harmful concentrations in the air. As a result, it is known mainly as a summertime air pollutant. Many urban areas tend to have high levels of ozone; rural areas can also have increased ozone levels.

Under the Clean Air Act (CAA), EPA has set protective health-based standards for ozone in the air we breathe. Prior to May 27, 2008, the National Ambient Air Quality 8-hour Standard for ozone was 0.080 ppm (157 micrograms per cubic meter--$\mu g/m^3$). In May of 2008, EPA revised the 8-hour standard to 0.075 ppm (147 $\mu g/m^3$). The EPA proposed a new primary and secondary ozone standard in the Federal Register on Tuesday Jan. 19, 2010. The final standard is expected to be issued by August 31, 2010. The new primary standard was proposed as a daily maximum 8-hour average in the range of 0.060 to 0.070 ppm. There are two ozone monitoring stations currently available in the PRB. According to the EPA AirData website, ozone levels have been monitored in the PRB since 2001.

As explained throughout the EIS, the WDEQ/AQD requires the PRB mines to collect air quality data. The eastern PRB is one of the most intensely monitored areas in the world. According to EPA AirData, there are six total suspended particulate (TSP) monitors, five $PM_{2.5}$ (particulates smaller than 2.5 microns in diameter) monitors and 36 $PM_{10}$ (particulates smaller than 10 microns in diameter) monitors in the Wyoming portion of the PRB. Data for TSP dates back to 1980 and data for $PM_{10}$ dates back to 1989. Approximately 57,000 TSP samples had been collected through 2004. Approximately 47,550 $PM_{10}$ samples had been collected through 2007. Information about the regulatory framework, the monitoring network, and $PM_{10}$ concentration trends since monitoring began are included in Appendix F of the EIS.

The federal standard for particulate matter was measured as TSP until 1987. This measurement included all suspendable dust (generally less than 100 microns in diameter). In 1987, EPA changed from a TSP-based standard to a $PM_{10}$-based standard. In 2006, EPA again revised the air quality standards for particulate matter by changing the 24-hour fine particle standard from the previous level of 65 $\mu g/m^3$ to 35 $\mu g/m^3$ and revoked the annual $PM_{10}$ standard of 50 $\mu g/m^3$. EPA retained the existing annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and the 24-hour $PM_{10}$ standard of 150 $\mu g/m^3$. These revisions took effect on December 18, 2006. The current federal ambient air standards are shown in Chapter 3 of the EIS. Wyoming added the $PM_{10}$ standard in 1989. Even with the evolution of state and federal small-size particulate standards, TSP is still monitored in some PRB locations as a surrogate for $PM_{10}$ and as an indication of overall atmospheric levels of particulate matter.

The Task 1A Report for the PRB Coal Review documents the modeled air quality impacts of operations during the baseline year using actual emissions and operations for that year. Emissions from minor sources were estimated due to unavailability of actual emissions data. The baseline year analysis evaluated impacts both within the PRB itself and at selected sensitive areas surrounding the region. The analysis specifically looked at impacts of coal mines, power plants, CBNG development, and other development activities.

As discussed in Chapter 3 of the EIS, modeling tends to over-predict the 24-hour impacts of surface coal mining and, as a result, WDEQ/AQD does not consider short-term $PM_{10}$ modeling to be an accurate representation of short-term impacts. In view of this, a memorandum of agreement between WDEQ/AQD and EPA Region VIII, dated January 24, 1994, allows WDEQ/AQD to conduct monitoring in lieu of short-term modeling for assessing coal mining-related impacts in the PRB. This agreement also requires Wyoming to implement "Best Available Work Practice" mitigation measures at any mine where an exceedance of the $PM_{10}$ and $PM_{2.5}$ NAAQS has occurred. The monitored exceedances at surface coal mines in the Wyoming PRB and the measures that WDEQ/AQD has implemented or is proposing to implement to prevent future exceedances of the $PM_{10}$ NAAQS are addressed in detail in Chapter 3 of the EIS.

It should be noted that WDEQ/AQD issues the permits to mine coal in Wyoming under the authority delegated to them by the EPA under the Clean Air Act (CAA). Wyoming mines in the PRB are permitted under the CAA as regulated emission sources. WDEQ permits identify mitigation measures that the permittee must carry out in order to comply with the permit. These measures are currently in place at the Wright Area mines. The WDEQ/AQD conditions permits to provide necessary mitigation. The WDEQ/AQD has stated clearly that they cannot issue any permit that violates ambient air quality standards.

**Comment Response 20:** Please review Section 4.2.14.5 in the EIS for the analysis regarding mercury from coal combustion. We disclose adverse health effects caused by mercury, bioaccumulation in the food web, and other issues. An estimate of the percentage of global mercury emissions contributed by the three applicant mines is included.

The estimated percentage of the annual total global anthropogenic mercury emissions from burning all of the coal produced from the Wyoming PRB, as well as from the three applicant

mines, is included in Section 4.2.14.5. Given the mines' projected future levels of production under the considered alternatives, the additional years of mercury emissions attributable to burning the coal produced by the three applicant mines are also included with the caveat that the uncertainties about future regulatory requirements and the use of the coal mined from the Wright Area LBA tracts make it difficult to project the impacts of mercury emissions that would potentially be produced from burning the coal included in these tracts.

Over the past decade, EPA has been focused on addressing environmental and human health mercury risks. EPA found that overall U.S. mercury air emissions have been reduced by 45 percent since 1990. In 2009, EPA estimated that mercury emissions from domestic coal-fired power plants accounted for about one percent of the global total. Coal-fired boilers are required to have control devices to reduce the amount of emissions that are released into the atmosphere. The use of air pollution control equipment at power plants in the U.S. has resulted in fewer emissions but has also increased the amount of solid residues.

Table 4-40 summarizes how the various continents contributed to the worldwide anthropogenic mercury emissions in 2004. As shown, the U.S. anthropogenic mercury emissions were estimated to account for about three percent of the global total. EPA estimates that 83 percent of the mercury deposited in the U.S. originates from international sources outside the country, with the remaining 17 percent coming from the U.S. and Canada.

As described throughout the EIS, BLM does not govern coal-fired power plant emissions, air quality standards, nor pollutants. BLM does not permit, nor authorize, mining operations and does not have the authority to regulate mining operations or the burning of coal. The Clean Air Act requires the EPA to regulate air pollutants and to develop regulations, rules, and standards for industries that emit one or more pollutants in significant quantities.

**Comment Response 21:** Please refer to Section 3.4.4.2 in the EIS for the lake acidification analysis. As noted in the EIS, USFS has been monitoring air quality in the Wind River Mountain Range in Wyoming since 1984 and is seeing a general trend of decreasing sulfates. We also address acid rain in Section 3.4.3.2, 3.4.4.2.1, and 4.2.14.2 of the EIS.

To help reduce acid rain, EPA implemented a program to reduce releases of $SO_2$ and other pollutants from coal-fired power plants. The first phase began in 1995 for $SO_2$ and targeted the largest and highest emitting power plants. The second phase, started in 2000, set tighter restrictions on smaller coal-, gas-, and oil-fired plants. Scientists predict that the decrease in $SO_2$ emissions required by the Acid Rain Program will significantly reduce acidification. Regulatory limits on emissions by coal-fired power plants have been and will continue to be administered and implemented by EPA.

In a 2002 USGS analysis (USGS Fact Sheet-038-02), Appalachian and Illinois Basin coals supplying a Kentucky power plant were found to contain 2.5 to 3.5 percent sulfur. In the same study, Powder River Basin coal supplying an Indiana power plant was found to contain 0.23 to 0.47 percent sulfur. The study indicated that PRB coal contained approximately 8 times less sulfur than coals being used from the Appalachian and Illinois Basins. As explained in Chapter

4 of the EIS, one of the reasons that PRB coal competes well in the coal market is because of its low sulfur content and value in helping to lower $SO_2$ pollution from coal-fired power plants.

**Comment Response 22:** Please see Section 3.6 in the EIS for the alluvial valley floors (AVFs) analysis. It is BLM policy to not lease lands that could not be permitted for mining under Section 510 of the Surface Mining Control and Reclamation Act (SMCRA). For stream-laid deposits that could possibly be AVFs, we ask for comment from WDEQ/LQD as to whether these areas could be mined and reclaimed in accordance with WDEQ/LQD and SMCRA regulations. If WDEQ provides a preliminary finding that the AVF is significant to farming and that protection of the AVF precludes mining, BLM will not lease those lands. Neither the WDEQ nor OSM, both cooperating agencies on this EIS, identified additional areas as potential AVFs that would be unsuitable for mining.

**Comment Response 23:** Please see Section 3.7 in the EIS for the wetlands analysis and to review site-specific wetlands and restoration information. As stated in the EIS, the U.S. Army Corps of Engineers (COE) requires mitigation of all impacted jurisdictional wetlands in accordance with Section 404 of the Clean Water Act. As described in the EIS, wetlands are restored under the jurisdiction of the COE. There are special required permitting procedures to assure that after mining, there would be no net loss of jurisdictional wetlands.

If a lease is issued, a formal wetland inventory is completed and submitted to the COE for verification as part of the permitting process. COE reviews all surface coal mining and reclamation permits. For any LBA tract that is leased, restoration of jurisdictional wetlands would be required, and consultation with the U.S. Army Corps of Engineers (COE) would be completed during the permitting process.

COE is the agency with the authority to approve plans for wetland restoration and the number of acres to be restored. COE considers the type and function of each jurisdictional wetland that will be impacted and may require restoration of additional acres if the type and function of the restored wetlands will not completely replace the type and function of the original wetland. The wetland mitigation plan, approved by COE, then becomes part of the WDEQ/LQD mining permit. WDEQ/LQD is the agency that permits mining operations and has authority to enforce mining regulations; they can require the restoration of some non-jurisdictional wetlands depending on the values associated with the wetland. WDEQ requires restoration of playas if they have hydrologic significance. Reclaimed wetlands are monitored using the same procedures used to identify pre-mining jurisdictional wetlands.

Naturally occurring wetland areas within the general Wright analysis area and, generally speaking, in the overall Wyoming PRB, are typically associated with the presence of surface water and shallow groundwater that exists within alluvial deposits. They are generally thin, very limited in areal extent, and are closely associated with drainage channels. Riverine, palustrine-type wetlands are the most common type and are typically defined by their close association with drainage channels. These wetland areas occur sporadically along the channels and banks and are generally supported by periodic, seasonally-occurring flow events that recharge the alluvial

deposits. Wetland areas and other waters of the U.S. also occur within naturally-occurring playas and depressions, as well as stockponds built within the drainages; however, those features are also strongly associated with the presence of surface water rather than groundwater. Of particular note, as described in the EIS, all the streams in the general Wright analysis area are naturally ephemeral.

Shallow groundwater tables in the general Wright analysis area are predominantly associated with alluvial deposits and are therefore extremely limited in both occurrence and areal extent, and typically exist only along the ephemeral drainages. Once the drainages that have been disturbed by mining are reclaimed in order to restore their pre-mining essential hydrologic functions, the shallow alluvial deposits that were replaced, as required by mine permit, will resaturate. Reestablishment of a shallow alluvial groundwater table and associated wetland areas will be dependent upon the occurrence of ephemeral streamflow events.

As disclosed in the EIS, during the mining and reclamation period when the drainages and playa areas are disturbed, there is a temporary loss of wetlands. Monitoring efforts conducted by the mines have observed that surface runoff and sediment control structures (i.e. reservoirs and diversion channels) potentially act as seasonal wetland areas at times for wildlife. As previously mentioned, complete and timely reclamation of wetland areas that are disturbed by surface coal mining in the PRB is required by the U.S. Army Corps of Engineers and the WDEQ.

**Comment Response 24:** The USFWS is responsible for the administration of the Endangered Species Act (ESA). It is the mandate and responsibility of the Service to provide guidance to federal agencies in how to avoid adverse impacts to protected species and habitats. Through the Section 7 process, the Service consults with agencies on how proposed projects may impact and affect listed species. All federal agencies have a responsibility under Section 7(a)(1) of the ESA to conserve federally listed threatened and endangered species.

BLM recognizes that Ute Ladies'-tresses orchid (ULT) is listed under the ESA as a Threatened species. Please see the Biological Assessment in Appendix G of the EIS for the detailed analyses regarding ULT. The Wright Area mines have conducted multiple ULT surveys over multiple years according to the guidelines that were written and provided by USFWS. The Service developed these guidelines in concert with professional biologists, botanists, and ecologists that were knowledgeable about this species. BLM prepared and provided the Wright Area EIS, Biological Assessment (BA), and Biological Evaluation (BE) to USFWS and USFS for their review. BLM has improved and revised the EIS, BA, and BE based on their reviews.

BLM is partnered with USFWS in fulfilling our Section 7 consultation obligations and responsibilities. BLM will continue to coordinate and consult with USFWS on listed species and will work to ensure that our projects do not adversely affect nor jeopardize threatened and endangered species. Section 7 consultation will be completed before any decision is made on the Wright Area EIS LBAs.

**Comment Response 25:** You state in your comment letter that Canada lynx and piping plover use lands in the PRB mining area. Unless you have direct species observation information to contribute, your comment is erroneous. If you are in possession of observation data or verified, legitimate distribution information regarding these species, please contact the USFWS Ecological Services in Cheyenne, Wyoming immediately as they would be highly interested in any valid data that you may have.

The USFWS is responsible for the administration of the Endangered Species Act (ESA). It is the mandate and responsibility of the Service to provide guidance to federal agencies in how to avoid adverse impacts to protected species and habitats. Through the Section 7 process, the Service consults with agencies on how proposed projects may impact and affect listed species. All federal agencies have a responsibility under Section 7(a)(1) of the ESA to conserve federally listed threatened and endangered species.

As described in the EIS, see Section G-4.0 of the Biological Assessment for the detailed analyses regarding the status of Threatened and Endangered species in Campbell County where the Wright Area mines are located. As explained in the EIS, USFWS biologists have used the best scientific information available to formulate a list of Threatened and Endangered (T&E) species that occur in or may be affected by proposed projects in Campbell County. Updated in March, 2010, the list clearly shows one species that is currently recognized as Threatened (Ute Ladies'-tresses), and one species that is recognized as Endangered (Blowout Penstemon). Please contact the USFWS Ecological Services regarding any issues that you may have with the T&E species list that the Service's professional biologists prepared for Campbell County.

BLM prepared and provided the Wright Area EIS, Biological Assessment (BA), and Biological Evaluation (BE) to USFWS and USFS for their review. BLM has improved and revised the EIS, BA, and BE based on their reviews.

BLM is partnered with USFWS in fulfilling our Section 7 consultation obligations and responsibilities. BLM will continue to coordinate and consult with USFWS on listed species and will work to ensure that our projects do not adversely affect nor jeopardize threatened and endangered species. Section 7 consultation will be completed before any decision is made on the Wright Area EIS LBAs.

**Comment Response 26:** Please refer to Section 3.3.2.1.2 in the EIS regarding methane, or CBNG. BLM recognizes that CBNG is a valuable energy resource and BLM policy encourages the development of this resource, where economically feasible, in advance of coal mining. The EIS acknowledges that much of the CBNG resources have already been recovered by existing oil and gas operators. CBNG has been commercially produced in the PRB since 1989. By 2005, drilling activity in the areas adjacent to the coal mines had declined significantly. The EIS points out that there has been little recent interest in drilling CBNG in the general Wright analysis area.

**Comment Response 27:** Please see our extensive cumulative impacts analysis in Chapter 4 of the EIS. Over 100 pages in length, our analysis is rigorous and comprehensive.

The Powder River Basin (PRB) Coal Review began in 2003. The Review's purpose was to evaluate the current condition of environmental and socioeconomic aspects in the PRB for a base year, to project reasonably foreseeable development in future years, and to develop models as well as other quantitative and qualitative tools to estimate future effects on environmental and socioeconomic aspects. The PRB Coal Review is not a NEPA document. It is a planning tool, a set of environmental impact analysis tools, and, when maintained through the years, is a method to calibrate development projections and related estimation of effects.

The Coal Review products were delivered and posted for public access in 2005 and 2006. Several of the initial 2005 and 2006 reports have been updated. The 2010 air quality modeling report has been supplemented by adding 2015 modeling and, most recently, 2020 modeling. BLM has also tracked annual development activity and has updated that work through 2008; the 2009 data will be added as it becomes available. With the 2009 completion of the groundwater model and the 2020 air quality modeling work, the reports have been issued and incorporated into the Wright Area Final EIS cumulative analysis. In addition, EPA specifically commented that the PRB Coal Review studies were used effectively in the Wright Area EIS discussion of the cumulative environmental consequences.

The Coal Review is a dynamic, expanding body of information; new data is added continuously as it becomes available. The Review has been available to the public since 2006 and was the subject of an open house in May of that year to explain and demonstrate the modeling and report products. The Review is available online at:
http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/ prbdocs.html

Modeling and report updates and revisions are posted to the website as they are completed, and, when used as a tool for cumulative impact analysis or planning, the latest task report data and results are used. BLM recognizes that the PRB Coal Review is not the only source for cumulative impact analysis, which is why land use plans, WDEQ's Cumulative Hydrologic Impact Assessments, and other sources and tools are used in addition to the Coal Review.

Connected actions have also been addressed in Chapter 4. As previously discussed, this chapter addresses current or planned development in the Powder River Basin (PRB) and describes PRB cumulative development and the cumulative environmental consequences of that development. Both low and high production scenarios with projections to the year 2020 are discussed. Past, present, and reasonably foreseeable development and the cumulative environmental consequences of that development are also detailed. The years 2010, 2015, and 2020 were selected for the analysis of the direct, indirect, and cumulative impacts in Chapter 4. This is the duration of the expected production as related to the LBA coal reserves.

Your comment suggests that the EIS should examine a wide variety of actions with the only connection being that all the actions are under the jurisdiction of the Department of the Interior (DOI). Your suggested approach fails to recognize that each of these proposals are federal actions in their own right, and must be evaluated in light of the effects of that action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

The EIS addresses the environmental effects of leasing coal in the PRB and the logical result that the coal would potentially be mined by adjacent operating mines. The EIS further discloses indirect emissions with the assumption that coal would be mined and burned to produce electricity. It is beyond the scope of this EIS to analyze all the DOI-authorized projects and proposed activities that occur in the United States.

**Comment Response 28:** To be clear, the Powder River Basin (PRB) Coal Production Region is a coal production region. Decertification of the region recognized that the PRB was expected to continue as a coal production region, but that the leasing would be primarily for maintenance of production at already existing mines. In 1990, the Powder River Regional Coal Team (RCT) and BLM recognized that the PRB had become a mature coal production region where the leasing interest would not reflect leasing for reserves to commence a new mining venture, but, rather, the coal resources would be sought to replace reserves depleted by production at existing mines.

Coal leasing in the PRB had operated as a federal coal production region under the definition at 43 CFR 3400.5, with leasing addressed under the regional leasing process as described under 43 CFR 3420, through the 1980s. Many of the federal coal production regions were decertified in the later 1980s, in large part because of a decline of interest in leasing federal coal (64 FR 52240). However, many of the Wyoming PRB mines had depleted their original leases during the 1980s, and there was a recognized need for replacement reserves in order to maintain production at these mines.

In 1989, public comment was requested on partially or totally decertifying the PRB. While most comments were supportive, three parties expressed concern that decertification and the LBA process would lead to leasing abuse and restricted public involvement. In 1990, based on the advice of the RCT, BLM decertified the region. However, in light of concerns raised by the public, certain conditions of the decertification were established, in part, based on the RCT's advice: 1) the region was decertified for production maintenance leasing, 2) the RCT would remain active to guide leasing, 3) new mine starts or expansions would be considered on a case by case basis, and 4) operating guidelines for LBAs would be adopted.

In a region that is decertified, BLM is able to consider leasing by application (LBA) under the rules at 43 CFR 3425. The RCT has met about once each year since the decertification. BLM has presented all lease by applications to the RCT and has considered their advice on how to proceed with those applications. LBAs have been rejected by BLM since decertification, consistent with public comment at RCT meetings, and RCT advice.

Decertifying the PRB recognized the need for a production maintenance leasing mechanism. Decertifying the PRB did not cause LBAs to occur, but recognized the need that existed at the time of decertification, and continues to exist as evidenced with the Wright Area LBAs and other coal lease applications.

You are correct that production of PRB coal has increased steadily since decertification. Part of this growth is due to an increase in the demand for electric power and the related increase in demand for steam coal as a fuel for low cost electric generation. There are also cost (mining and

reclamation) advantages that have favored PRB coal over other domestic coal regions as well as the low sulfur content of PRB coal, which results in cost-effective air pollution control.

The production increase has been made with no new mining operations opening since decertification, although several of the operations have consolidated. As shown in Figure 4-2 in the EIS, leasing under the LBA process has essentially been at the same rate as reserves existing before decertification have been being depleted. This level of leasing activity remains consistent with the 1990 decertification action.

Production maintenance leasing does indeed define a leasing level. BLM has managed leasing to assure that the rate of new reserves being leased matches the rate of reserve depletion through production. This avoids reserves being offered at speculative value while balancing a reserve base to allow coal producers to maintain production capacity (equipment and employees).

The lease application is submitted in order to identify those lands that the applicant has identified as needed to maintain production at an existing mine. BLM formulates alternatives (Alternatives 1 and 2 in this EIS) that may include more or less lands than are included in the application. Under these alternatives, BLM is able to reconfigure the tract in the public interest to conserve coal resources, enhance competitive potential, and mitigate impacts. BLM has frequently (in almost every LBA offered) delineated a preferred alternative smaller or larger than the application, and containing some different lands than those applied for by the applicant.

It is logical, prudent, and is generally in the public interest for the lease tracts to be adjacent to one or more existing mines. These are production maintenance tracts and, as such, are located so that existing operations could potentially pass onto these tracts without having to open a new pit, which would require significant additional disturbance and higher costs.

BLM has offered coal tracts at several sales where multiple bids were received. There have been sales where the applicant was not the successful bidder. The sales are always competitive, even if there is only one bidder, because the BLM sets a fair market value and will not accept any bid that does not meet that value. These values are not disclosed, and bidders recognize that they need to bid a fair value or the bid will be rejected. BLM has rejected numerous bids that were the apparent high bid.

BLM's practices and administrative controls ensure that fair market values are received for the LBA tracts that are delineated by BLM. The tracts offered by BLM 1) allow coal production to be maintained at already operating mines, 2) avoid coal resource bypass and isolation, and 3) encourage competition.

The BLM properly established the Powder River Coal Production Region as required by 43 CFR 3400.5. The change to the region was published in the Federal Register on January 9, 1990 (55 FR 784-785). BLM has, and continues to manage the LBA process in conformance with the criteria, conditions, and requirements of a decertified coal region.

Processing the Wright Area lease by applications is consistent with the practice we follow in the decertified Powder River Coal Production Region. These are production maintenance tracts,

have been reviewed by the Powder River Regional Coal Team, and are being reviewed under the leasing by application process (43 CFR 3425).

The Powder River RCT meetings are public and provide an opportunity for public comment and statements. Notices for upcoming Regional Coal Team meetings are published in the Federal Register and a press release is also posted on the BLM website. The public is always welcome and is encouraged to attend.

The comment asks whether BLM has made a decision that the entire PRB is unacceptable for further consideration for coal leasing. This is not the case. This determination is based on findings from the resource management plans (RMPs) that encompass the Wright Area. Appendix B in the EIS summarizes the findings of the RMPs as well as a review completed as part of the EIS analyses to update and specify the acceptability for further consideration for coal leasing of lands within the general Wright analysis area.

Like the regional leasing option under 43 CFR 3420, lease by application requires appropriate analysis and assessment of the environmental impacts of coal leasing. Lease by application also requires the opportunity for public participation. The NEPA process resulting in the Wright Area Coal EIS achieves these requirements. Alternative regional leasing levels are not addressed in the LBA process because, as previously discussed, production maintenance leasing is the defined leasing level appropriate to a decertified coal production region. Coal leasing decisions under the lease by application process consider coal economics, both direct and cumulative impact to the environment, and socioeconomic impacts.

The Wright Area Coal EIS is not a regional EIS in the sense of the regulations at 43 CFR 3420. However, the EIS has been properly scoped to address direct, indirect, and cumulative impacts of the proposed leasing. BLM has chosen to address the currently pending LBAs in four separate EISs, some addressing groups of LBAs because of their geographical proximity, others as individual LBA EISs due to either no other LBAs in proximity or the fact that the EIS was already well underway prior to the nearby LBAs being filed. Each EIS is consistent in addressing the specific impacts of each LBA, in addressing the cumulative impacts of the specific LBA when added to other reasonably foreseeable activity, and in having complete public involvement at every step in the NEPA process.

There are considerable undeveloped reserves in the U.S., about half the world's reserves. The Energy Information Administration (EIA) estimates that there are over 250 billion tons of accessible demonstrated reserves in the nation, with about 20 billion committed to existing mining operations. Twenty billion tons represents 50 years of production from the PRB that are presently committed to production, some of which are held by existing PRB operators. At an annual domestic production of one billion tons per year, existing domestic coal mines can produce coal for twenty years, relying solely on already committed reserves.

A Record of Decision (ROD) will be issued for each LBA addressed in this EIS. In the ROD, BLM will reach a decision as to whether to reject the LBA or competitively offer a coal tract in response to the LBA. The ROD will address the public interest considerations made in the decision.

**Comment Response 29:** We acknowledge that the EIS can be challenging to read at times due to its complex nature, detailed resource information, and technical analyses. To improve the readability, we have prepared a comprehensive executive summary to condense and highlight the results of the analyses. We have also provided technical evaluation appendices in order to improve readability. Please use the Table of Contents to help guide and focus your examination of this document.

**Comment Response 30:** We have summarized the discussion and have added information to the Executive Summary.

**Comment Response 31:** The information provided in your comment letter has been considered in the preparation of the EIS.

**Comment Response 32:** Blasting by surface coal mines is conducted in accordance with Chapter 6 of the WDEQ/LQD Coal Rules and Regulations. Specific control measures for blasting would be developed during the permitting process, when mining operations are authorized.

Voluntary administrative controls are in place and are common components of the mines' operating procedures to mitigate and reduce blasting-related $NO_x$ emissions. Several PRB mines have voluntarily elected to no longer employ cast blasting methods. As stated in Section 3.4.3.1.1 of EIS, the primary control measure for mitigating exposures to offsite residents is to avoid cast blasting when wind directions or atmospheric conditions are unfavorable. As stated in Section 3.4.3.3, weather and atmospheric conditions are closely monitored prior to the decision to detonate a blast. If unfavorable conditions prevail, a decision will be made to postpone the blast until conditions have become favorable. EPA's suggested mitigation methods are included in Section 3.4.3.3, which is comprehensive and has been reviewed by WDEQ/AQD.

The BLM does not authorize mining operations by issuing a lease and does not regulate mining operations after a lease is issued. As discussed in Section 1.3 of the EIS, WDEQ is authorized by the Secretary of the Interior to regulate surface coal mining operations on federal and non-federal lands within Wyoming.

**Comment Response 33**: The annual NAAQS and WAAQS for $NO_2$ is 0.053 ppm (53 ppb), which is equivalent to 100 $\mu g/m^3$. The new 1-hour primary NAAQS for $NO_2$ is 100 ppb. The maximum annual average $NO_x$ prediction for the Jacobs Ranch Mine (year 2013) was 55 $\mu g/m^3$, or 29.2 ppb, well below the federal and state standards. EPA's error in stating that the $NO_x$ prediction for the Jacobs Ranch Mine for 2013 exceeds the NAAQS by 2 ppb is due to a confusion of measurement units. Mitigation measures that are implemented to reduce mine-related $NO_x$ emissions at the three applicant mines are addressed in Section 3.4.3.3 of the Final EIS.

Section 3.4.2.2.1 states that the potential impacts from mining the LBA tracts have been inferred from the projected impacts of mining the existing coal leases as currently permitted. Modeling for each of the three applicant mines, as contained in the mine's current air quality permit, indicates compliance with the $PM_{10}$ annual WAAQS. No impact analyses or modeling for $PM_{2.5}$ are included in the applicant mines' existing air quality permits, which were approved in 2007 (Jacobs Ranch Mine) and 2008 (Black Thunder and North Antelope Rochelle mines). The EPA Surrogate Policy allows states like Wyoming to use $PM_{10}$ as a surrogate for $PM_{2.5}$ in meeting New Source Review requirements under the Clean Air Act, including PSD permitting requirements. Since 1997, the WDEQ/AQD has followed and applied EPA's Surrogate Policy. On May 16, 2008, EPA promulgated a rule that provides states with SIP-approved PSD programs (like Wyoming) that require amendments to incorporate $PM_{2.5}$ into their state PSD rules time to accomplish these amendments to their State Implementation Plan (SIP), and these states have three years to incorporate $PM_{2.5}$ into their state PSD rules. During that SIP-amendment period, a state may continue to implement a $PM_{10}$ program as a surrogate to meet the PSD program requirements for $PM_{2.5}$ pursuant to EPA's 1997 Surrogate Policy.

Mining operations would continue on the existing mine leases as currently permitted, regardless of whether or not the six Wright Area coal lease applications are offered or rejected by BLM. As stated in Section 3.4.2.2.1, if the applicant mines acquire the LBA tracts, they will be required to amend their current air quality permits to include the new lease areas before mining activities can proceed into the new lease areas. New air quality modeling would include an adequate $PM_{2.5}$ modeling analysis to demonstrate compliance with the $PM_{2.5}$ WAAQS.

**Comment Response 34**: Section 3.4.2.3 of the Final EIS (Regulatory Compliance, Mitigation and Monitoring for Particulate Emissions) covers BACMs for dust control for all surface coal mines in the PRB, and it is stated that additional site-specific layout and mining practices may be included in individual mine and air quality permits.

Section 3.4.2.3 also states: "In response to the measured exceedances of the $PM_{10}$ NAAQS in certain areas of the PRB and in anticipation of possible future exceedances, the WDEQ/AQD in a joint effort with PRB mining stakeholders, developed a Natural Events Action Plan, or NEAP, for the coal mines of the PRB in April 2006 (revised January 2007). The NEAP was developed under the framework afforded by EPA's Natural Events Policy of May 30, 1996. EPA Region VIII approved the WDEQ NEAP on March 13, 2007, and the PRB mining operators have implemented these measures and are presently complying with the NEAP.

"EPA's Exceptional Event Rule of March 22, 2007 no longer requires a NEAP. However, according to the preamble to the Exceptional Event Rule (signed March 22, 2007, effective May 21, 2007), "The EPA believes that it is advantageous for states to keep NEAPs in place that are currently being implemented in order to address the public health impacts associated with recurring natural events such as high wind events. "However, following the promulgation of this rule, states will no longer be required to keep NEAPs in place that were not approved as a part of a SIP for an area." WDEQ will retain the NEAP because it provides the flexibility to control other emission sources, like fugitive emission sources, that otherwise might not be controlled

with BACT. The BACM specified in the NEAP contains an appropriate and reasonable minimum level of control as required under the Exceptional Event Rule for the PRB coal mines.

"WDEQ/AQD may require implementation of the control steps outlined in the NEAP and may require continual evaluation of activity plans when exceedances are monitored at surface coal mines. Some of these measures have been formally implemented at the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines through the establishment of a formal, site-specific mitigative response plan at each of those mines. A mitigative response plan will be developed by any mine that records an exceedance or violation of the NAAQS downwind of its mining operations.

"Other operational control measures that WDEQ/AQD may require at specific mines when exceedances occur include, but are not limited to, site-specific watering of inactive areas and problem areas; relocation of overburden truck-dumping operations and deferring blasting. The mines are experimenting with dust control treatments, including magnesium chloride, surfactants, and petroleum-based products. In addition, WDEQ/AQD may require additional monitoring, action levels based on continuous monitoring, expedited reporting of monitored exceedances, detailed reporting of contributing factors (e.g., meteorological conditions), and continual evaluation of activity plans when exceedances are monitored at surface coal mines.

"The WDEQ/AQD is continually reviewing the data and considering regulatory options, such as increasing the frequency of monitoring to be used as a means of better evaluating dust problems. For example, where elevated emissions have occurred, WDEQ/AQD has increased monitoring frequency requirements including installation of continuous $PM_{10}$ monitors, or TEOMs, which allow monitoring of emissions on a real-time basis. Other regulatory options may include enforcement actions such as Notices of Violation resulting in a consent decree and/or modified permit conditions. WDEQ/AQD is also coordinating with EPA to develop additional monitoring requirements in CBNG development areas, high $PM_{10}$ mitigation action plans in permits, and additional mitigation measures under the SIP."

**Comment Response 35**: Section 3.4.3.3 describes the voluntary measures that many of the PRB mines have implemented to avoid $NO_x$ emissions impacts to the public. Measures to avoid public exposure to $NO_2$ from blasting activities are requirements for the Black Thunder Mine as part of a settlement agreement reached in 2000. Considerable discussion in Section 3.4.3.3 addresses the mines' efforts to reduce $NO_x$ emissions from blasting activities. As noted in Table 3-9 and 3-10, the mean annual $NO_2$ concentrations for all PRB monitoring sites have historically been significantly below the WAAQS and NAAQS annual standard.

**Comment Response 36**: A summary of the GHG emissions projected with the addition of the six Wright Area LBA tracts was added to the Executive Summary.

**Comment Response 37**: The annual NAAQS for $NO_2$ (0.053 ppm or 100 $\mu g/m^3$) has been added to the text within the air quality section of the Executive Summary.

**Comment Response 38:** There is no scientific basis or regulatory requirement regarding the 3-mile buffer line; it was an arbitrary selection. The EIS has been revised to exclude the 3-mile buffer.

**Comment Response 39:** The projected modeled visibility impacts for all analyzed Class I and sensitive Class II areas were updated in Table 4-13 in the Final EIS using BLM's updated Task 3A report (Cumulative Air Quality Effects) for the PRB Coal Review.

BLM's PRB Coal Review is extensively referenced throughout Chapter 4 of the Wright Area Coal Lease Applications Final EIS in order to summarize the cumulative impacts occurring as a result of existing development in the PRB. The PRB Coal Review also describes how those impacts would change if other projected development, such as the leasing and mining of additional LBA tracts, were to occur in the area. Task 3 of the PRB Coal Review does not evaluate specific proposed projects within the PRB, but projects that would be expected to occur under the lower and upper coal production scenarios for 2010, 2015 and 2020.

The updated Task 3A report for the PRB Coal Review (Cumulative Air Quality Effects) uses 2004 as the baseline year with projected 2015 and 2020 lower and upper coal production scenarios. The baseline year emissions inventory was developed using 2004 actual emissions data and for the 2015 and 2020 analyses, the emission sources were projected for the assumed upper and lower coal production scenarios. Presenting the type and location(s) of the emissions contributing to the potential cumulative impacts throughout the PRB for 2015 and 2020 under the upper and lower coal production scenarios (as presented in Table 4-11 through 4-14) is considerably beyond the scope of the EIS for the Wright Area LBAs.

As noted, BLM has recently contracted a second phase of the PRB coal review for modeling to update the 2020 analysis and extend the forecast of regional air quality to year 2030. This project will analyze additional pollutants (i.e. ozone) and include photochemical grid modeling. EPA is a key member in the interagency stakeholder group that will review the modeling protocols for the second phase effort.

**Comment Response 40:** We have updated the data in Table 3-8 in the Final EIS and have revised the units to be consistent throughout ($\mu g/m^3$).

**Comment Response 41:** Thank you for your comment. We revised the Final EIS to incorporate the information that you provided.

**Comment Response 42:** The BLM does not permit, nor authorize, mining operations and does not have the authority to regulate mining activities nor mitigate air quality impacts. As discussed in detail in Section 1.3 of the EIS, WDEQ is authorized by the Secretary of the Interior to regulate surface coal mining operations and surface effects of mining on federal and non-federal lands within Wyoming.

As stated in Section 3.4.2.3 of the EIS, the WDEQ/AQD requires the Wyoming Powder River Basin mines to collect air quality data. As explained throughout the EIS, WDEQ/AQD has, by statute, the authority and responsibility to require mitigation for air quality impacts.

**Comment Response 43:** We have revised, reorganized, and updated Section 4.2.14 in the Final EIS.

**Comment Response 44:** The BLM's PRB Coal Review is available online at: http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html

The coal review reports and analyses are used and referenced in the cumulative impact analysis in NEPA documents prepared to evaluate coal leasing in the PRB like the Wright Area Coal Lease Applications EIS and other proposed projects. Since 2006, the coal review analysis has been reflected in each subsequent EIS as modified based on public comment on the analysis. The coal review has also been used to revise and update the BLM land use plans for the Casper, Miles City, and Buffalo Field Offices.

The PRB is a major energy development area with diverse environmental values. BLM and other federal and state agencies need data and analysis tools to evaluate cumulative impacts as additional development is proposed in the basin. The coal review updates historic baseline data and projects the potential future cumulative effects of coal leasing and development based on reasonably foreseeable future development scenarios.

The BLM Wyoming State Office has several pending applications to lease federal coal in the PRB. Each requires a NEPA analysis, and BLM plans to use the results of the PRB Coal Review in evaluating the cumulative impacts of leasing the federal coal included in these applications. The data and modeling tools are also relevant for the cumulative impact assessments for other project-specific impact assessments that BLM must prepare in order to comply with the requirements of NEPA by providing updated, readily available, and consistent information. Products of the study include databases containing future development activities, air quality, water, and socioeconomics information. These databases can be updated through time and used with the existing modeling programs to generate future projections of cumulative effects. As more data about actual development levels and actual associated impacts are collected and evaluated, conclusions based on projected development levels and projected associated impacts may need to be revised in the future to reflect the new information.

The study primarily addresses coal and coal-related development within the PRB and focuses mainly on air quality, water resources, and socioeconomics. The PRB Coal Review is a BLM project, but BLM has invited federal and state agencies with relevant technical expertise to help define the technical approach and content of the project and task reports. Work on the project began in 2003. The Task 2 report on foreseeable development was updated in 2009 based on actual development that had occurred through 2008. The reports estimating effects of future developments to air quality (Task 3A) were done in three parts, primarily to have the reports based on up-to-date emission data. The Task 3A report on estimated effects on air quality by

2010 was completed in 2006, the 3A report for effects by 2015 was completed in 2008, and the 3A report for effects by 2020 was completed in 2009. The reports estimating effects of future development to water (Task 3B) were done in two parts – surface and groundwater, which were completed in 2008 and 2009, respectively.

**Comment Response 45:** The public has had ample opportunity to participate in the NEPA process in regard to the Wright Area LBAs. Please see Section 1.6 in the EIS, which documents past public participation activities and describes future public involvement and commenting opportunities.

**Comment Response 46:** Please see the raptor nest site figures in Chapter 3 of the EIS. The raptor nests, including eagle, are clearly shown.

**Comment Response 47:** Coal mine outbursts are a phenomenon characterized by the sudden and often violent ejection of coal and gas from the solid coal face in an underground mine. When outbursts occur, they can be very serious events and are among the major killers of miners in underground coal mines. Scientists have been investigating coal outbursts for more than 150 years; the precise mechanism that causes the event is still largely unknown. Outbursts typically occur where the roof of the coal seam is well sealed and can generally be attributed to various anomalous geologic features such as structural faults. Studies have found that the gas storage capacity of coals increases with depth and coal rank. For example, subbituminous coals have much higher gas volume storage capacity than lignite coals. Outbursts happen only in deep underground mines where the coal bed is typically of a high rank (i.e., anthracite) and contains gas at high pressure.

Catastrophic release of methane does not occur at the coal face in the open pit mines of the PRB. A comparison cannot be drawn between the nearly instantaneous outburst of methane gas from a deep, high-ranking coal seam in an underground mine and the slow desorption of methane gas from a shallow, low-ranking coal seam in a surface mine. In order for CBNG to be produced from a subbituminous coal, hydrostatic pressure within the coal must be reduced to a level that allows the gas to desorb.

A study published by the U.S. Geological Survey in 2006 (*Gas Desorption and Adsorption Isotherm Studies of Coals in the Powder River Basin, Wyoming and Adjacent Basins in Wyoming and North Dakota*, USGS Open File Report 2006-1174) concluded that the subbituminous Fort Union coal beds having a greater gas volume storage capacity have greater hydrostatic pressures. Only the coal beds in the shallowest part of the basin are strip mined. Groundwater drains into the open mine pits, resulting in the dewatering of any saturated strata, including the coal seams, in the outlying areas. Dewatering of the coal seams mined in the eastern PRB has been ongoing since the mid-1970s. Coal bed methane development of the same seams that are mined began in the eastern PRB on a large scale in the early-1990s. The 2006 USGS study found that these shallow coal beds in the eastern PRB were essentially dewatered and drained of gas as a result.

A recent evaluation of CBNG reserves in the vicinity of the PRB mines by the BLM Wyoming State Office Reservoir Management Group (WSO-RMG, unpublished internal report, 2006) concludes that coal seam gas-in-place is dependent on a number of factors, including coal rank, coal lithology, and initial methane adsorption capacity of the coals, which is controlled by the hydrostatic pressure within the coal. CBNG reservoirs can, thus, be affected by depletion of hydrostatic pressure, such as from coal mining and the surrounding CBNG production. Reservoir analyses prepared by the WSO-RMG have shown that CBNG can generally no longer be economically produced from lands adjacent to the mining areas. Coal cores collected by the USGS and WSO-RMG in the vicinity of the mines generally show that coal seams were substantially depleted of water and natural gas. Therefore, coal seams exposed within open mine pits have typically been dewatered prior to removal of the overburden and are essentially depleted of all gas volume storage capacity. The ongoing reduction of hydrostatic pressure in the coal beds by the mine pits has been accelerated by extensive CBNG production from surrounding lands. The very small amount of residual methane and associated gases are vented to the atmosphere when the coal seam is actually mined; however, a small amount of venting can also occur naturally at the coal outcrop even in the absence of mining.

The article by D.A. Kirchgessner, S.D. Piccot, and S.S. Masemore (Kirchgessner et al. 2000) that is cited by Dr. Kass states: "… methane is retained by the coal bed and surrounding strata as long as it remains under pressure and, assuming that no geologic processes breach the reservoir first, mining releases this pressure and the methane escapes," and "… vertical wells can be drilled into the coal in advance of underground mining to drain methane from the coal." Kirchgessner and others may have indeed developed a method for direct atmospheric measurement of methane emissions from surface coal mines. However, Dr. Kass' statement that "using coal core samples to measure mine methane is fallacious" may stem from his unfamiliarity with the science of determining gas content from the desorption of gas (generally methane) from coal using methods described by Diamond and Schatzel (1998). The gas storage capacity of the PRB coal core samples were determined by the USGS (Open File Report 2006-1174) using those methods.

As stated in Section 3.3.2.2.1, the CBNG resource within the Wyodak-Anderson coal seam has been substantially depleted, either by mining or by recovery from producing CBNG wells nearby. Furthermore, mining operations within the LBA tracts could not begin until permitting is completed, which generally requires several years after a lease is acquired. By that time, it is very likely that most, if not all, of any remaining recoverable CBNG resource will have been exhausted prior to the initiation of mining in the LBA tracts.

As PRB mining operations continue to follow the coal seams downdip, the rate at which the open pits advance will decrease as more and more overburden must be removed to uncover the coal. Even though hundreds of feet of overburden must be removed, the coal will not become wetter or more pressurized due to the constant and continuous dewatering that is the inevitable consequence of open pit mining.

The Final EIS does account for methane emissions from exposed unmined coal at the three applicant mines. The amount of methane vented annually, based on the mines' projected maximum future mining rates and the gas content data obtained by the USGS and WSO-RMG from coal cores, is included in Section 3.18.2. The total amount of anthropomorphic methane

emissions attributed to surface coal mining is given in the DOE's annual report on the emissions of GHGs in the U.S. Citing DOE's most recent annual report, Section 4.2.14.2 in the Final EIS provides an estimate of the methane emissions contributed by the three applicant mines in 2008.

**Comment Response 48:** PRB coals have a lower BTU per pound than higher ranked coals. This is due in large part to moistures in PRB coal. However, $CO_2$ is created as a result of the oxidation of the carbon content in the coal. So with PRB coal, the same energy requires a greater weight of coal, but the same amount of carbon content, resulting in the same amount of $CO_2$.

As stated throughout the Wright Area EIS, the EIS was prepared pursuant to the NEPA and other applicable regulations and statutes to address possible environmental and socioeconomic impacts that could result from potentially leasing the Wright Area LBA tracts. We have assumed that if the tracts are leased, they would be mined. That assumption was used to develop the analysis in Chapter 3 regarding GHG emissions potentially resulting from the mining of the tracts. Chapter 4 of the EIS estimates the cumulative effect of all reasonably foreseeable development activity in the PRB that would likely occur contemporaneously with the assumed mining of the LBA tracts. In this analysis, it is assumed that PRB coal would continue to be used as steam coal for electric generation at a rate similar to recent use. The analysis recognizes that future use of PRB coal, and coal in general, for electric generation is not entirely known, but, based on current electric generation portfolio forecasts, it is likely.

We acknowledge that your method of estimating GHG emissions related to the mining, transport, and consumption of coal is reasonable if one were trying to show the impact of electric generation using coal. Decisions from this EIS will not determine if electric generation from coal continues, and if so, where the coal consumers will buy coal. These matters will be addressed in the marketplace and by law and policies that influence decisions of electricity producers and utility regulators.

**Comment Response 49:** Coal fines fall from rail cars and accumulate along the rail line. The adverse effects of this accumulation, as well as potential mitigation are addressed in Section 3.15.4.1 of the EIS. WDEQ has responded to complaints from landowners where coal fines are escaping the railroad's right of way.

**Comment Response 50:** Please refer to Section 3.3.2.1.2 in the EIS regarding methane, or CBNG. BLM recognizes that CBNG is a valuable energy resource and BLM policy encourages the development of this resource, where economically feasible, in advance of coal mining. The analysis in the EIS clarifies that CBNG has been commercially produced in the PRB since 1989. The EIS discloses the release of methane as a result of mining, and that coal seams were already substantially depleted of CBNG in the vicinity of the mines in 2000. By 2005, drilling activity in the areas adjacent to the coal mines declined significantly. There has been little recent interest in drilling CBNG in this area.

Your cited reference of Rice, Ellis, and Bullock (2000) is the U.S. Geological Survey Open-File Report 00-372, "*Water co-produced with coalbed methane in the Powder River Basin, Wyoming: preliminary compositional data*". This report describes the water quality characteristics of only the Wyodak-Anderson coal seam. While it is true that groundwater produced from the Tongue River Member of the Fort Union Formation coals has relatively low sulfate concentrations, groundwaters from the overlying Wasatch Formation and recent alluvial deposits typically have high levels of sulfate, and, as a result, do not meet WDEQ's standards for either domestic or agricultural uses due to the exceedingly high sulfate concentrations. Please see Section 3.5 in the EIS for descriptions of the quality of groundwater associated with each of the water-bearing geologic units that have been, and will continue to be, affected by surface coal mining and CBNG development in the PRB.

There is a paucity of data on the occurrence of radium in the surface and groundwater systems of the PRB. WDEQ does not require coal mine operators to monitor radiochemical constituents in surface water or groundwater within and around their operations. BLM is aware of radiochemical data that is listed for 65 groundwater sites in the PRB and adjacent areas in northeastern Wyoming in a 1984 data report (Open-File Report 83-939). Those data, however, may not be completely representative of current conditions considering the level of development that has been ongoing in the basin over the past 26 years. No other published radiochemical data for naturally-occurring waters in the PRB are known to exist.

The 2002 Powder/Tongue River Basin Water Plan, which was prepared by the Wyoming Water Development Office, stated that "radium-226 may be of concern near uranium ore deposits." Wyoming has been the nation's leading producer of uranium ore since 1995, and numerous uranium mining sites are present in the PRB. Pumpkin Buttes, the primary uranium mining district in the basin, is located more than 20 miles west of the general Wright analysis area. None of the uranium mining sites are located within the same watersheds that the three applicant mines and the six Wright Area LBA tracts are located in. Uranium mining in the PRB is conducted by the in-situ recovery method, which is highly monitored and regulated by the WDEQ and the Nuclear Regulatory Commission. Due to the great distances between the general Wright analysis area and the uranium mining districts in the PRB, cumulative impacts to water resources from these operations were not considered in this EIS.

Radon gas is not known to be associated with either the Wasatch or Fort Union formations in the eastern portion of the PRB where the surface coal mining operations are located.

**Comment Response 51:** BLM recognizes that CBNG is a valuable energy resource and BLM policy encourages the development of this resource, where economically feasible, in advance of coal mining. We acknowledge your comment of the importance in recognizing that the rights and lease obligations of federal oil and gas lessees be honored.

If a decision is made to lease an LBA tract, mining operations within the tract would not begin until the permitting process is completed, which generally requires several years after a lease is issued. BLM's special coal lease stipulations are identified in Appendix D of the Final EIS.

These stipulations specifically address multiple mineral development and oil and gas/coal resources.

Additionally, BLM's CBNG-coal policy provides the agency's decision-makers with some latitude and tools to assist in working out reasonable accommodations among the lessees of coal and oil and gas in order to optimize the recovery of both of these resources and to ensure that the public receives a reasonable return. BLM recognizes that cooperation in recovering as much of the commercially available methane as possible prior to mining will help to reduce the atmospheric release of residual methane that results from mining and shipping coal.

Another aspect of accommodation between oil and gas operators is the timing of well abandonment and mining and reclamation operations. It is reasonable to defer extensive reclamation on oil or gas sites, when mining and reclamation will follow in a short period of time. In these cases, it is possible to temporarily stabilize sites until mining and reclamation activities occur.

**Comment Response 52:** Air pollution is controlled by state and federal air quality regulations and standards established under the federal Clean Air Act Amendments. State implementation plans are in place to ensure that actions like coal mining operations comply with all associated air quality regulations and criteria. The Wyoming Ambient Air Quality Standards for the $PM_{10}$ annual and the $NO_x$ annual and 24-hour levels are more stringent than the National Ambient Air Quality Standards and are enforced by the WDEQ/AQD.

Large surface coal mines have the potential to become particulate emission sources in the PRB contributing to air quality degradation. By statute and delegation, WDEQ/AQD has the authority and responsibility to require mitigation for air quality impacts. WDEQ has stated that they will not permit mining operations that don't comply with the standards.

Any LBA offered as a result of this EIS will have a condition placed on the lease requiring the lessee to comply with the air quality regulations. The LBA would be an additional lease mined in conjunction with other leases and state and private lands in order to maintain production at an existing mine. WDEQ air quality permits regulate and mitigate air pollution for an entire mining operation, where any specific mitigation on a single lease would apply only to that lease.

The FEIS contains recently completed results of regional air quality modeling that was done in order to estimate the cumulative air quality effects of all reasonably foreseeable development in the PRB by year 2020. As noted in EPA's letter, BLM has recently contracted for modeling to extend the forecast of regional air quality to year 2030. This modeling should be available for use by regulatory agencies when considering any future permitting related to adding LBA leases to mining operations.

**Comment Response 53:** We have revised the Final EIS to include additional information regarding cultural resources. As described in Section 3.12 of the EIS, Class III site-specific cultural surveys have been completed for each of the six LBA tracts included in this EIS.

BLM initiated Native American consultation with the tribes on December 16, 2008 in regard to the Wright Area LBAs. We will continue to consult on site-specific culturally significant areas located within the general Wright analysis area.

Regulatory compliance, mitigation, and monitoring requirements for cultural resources are described in Section 3.12.4. Native American consultation will continue throughout the permitting process and will be completed by the Office of Surface Mining Reclamation and Enforcement prior to any surface disturbing activities. The BLM's and U.S. Forest Service's coal lease stipulations with respect to cultural resources are included in Appendix D of the Final EIS.

The effects on regional air quality (including the Class I and Sensitive Class II areas in and around the Black Hills) as a result of all development predicted in the PRB by 2015 were modeled. Those results are discussed in Chapter 4 of the Final EIS. We have also included recently completed modeling that projects the effects of all development through the year 2020. We did not identify measurable direct or indirect impacts from PRB development activity on water quality in the Black Hills.

**Comment Response 54:** We appreciate your comment and readily acknowledge the importance of agriculture to the community and nation. Section 3.11.1 and 3.11.2.1 in the Final EIS has been revised and expanded to include additional information regarding the impacts and potential loss of grazing on the USFS Thunder Basin National Grasslands (TBNG) allotments contained within the Wright Area LBAs.

During mining operations, lands are taken out of production for grazing and are not restored until the lands are capable of supporting grazing. As described throughout the EIS, reclamation is a long term process, and to achieve bond release, the mines must demonstrate to the Wyoming DEQ/LQD that the land is capable of withstanding grazing pressure comparable to pre-mining conditions. In general, if the LBAs are leased, the loss of access to federally administered public lands included in the tracts may extend for 20 years or more after permitting depending on individual mine plans, mine variation in coal production rates, permitting requirements, and reclamation sequence and succession.

As described in the EIS, portions of the TBNG are included in five of the six LBA tracts and their study areas. Table 3-15 depicts the distribution of surface ownership for BLM's preferred alternatives. As shown, approximately 12,481 acres of federal surface administered by the USFS is included in the North, South, and West Hilight Field tracts and in the North and South Porcupine tracts under Alternative 2, BLM's preferred alternative. Section 3.11.1 in the EIS discloses that these federal lands are located within USFS Grazing Allotments #270 (located in the North Hilight Field tract), #256 (located in the South and West Hilight Field tracts), #266 (located in the West Hilight Field tract), #280, #223, #240, #298, #264, #282 (located in the North Porcupine tract), and #278 and #281 (located in the South Porcupine tract). All of these allotments are currently held by the Thunder Basin Grazing Association (TBGA). If the federal lands are leased for coal, the livestock producers that depend upon these grazing allotments

would be negatively impacted. The EIS discloses that livestock grazing has been the primary use of these lands in the past.

A number of livestock producers depend upon grazing USFS-administered lands within the Wright EIS general analysis area in order to maintain their ranch viability and sustainability. As stated above, much of the general Wright analysis area is currently permitted for grazing use through a grazing agreement between USFS and the TBGA. Overall, this agreement annually permits the TBGA for 71,500 Animal Unit Months (AUMs) on approximately 351,192 acres of TBNG for a period of ten years. In turn, TBGA permits these allotments to its individual members.

If the Wright Area LBAs are leased, approximately 12,481 acres of TBNG surface that are currently permitted for federal grazing by the TBGA would be suspended during mining and reclamation activities. This suspension would result in an additional seven allotments that would no longer be available for grazing. One allotment would be reduced by approximately 50 percent and three allotments would have small reductions in grazing. In total, approximately 2,890 AUMs would be lost from the TBGA, or four percent of the total grazing agreement due to the potential leasing and mining of the Wright Area LBAs. In combination with past impacts, these additional AUM reductions from mining would result in three TBGA members that would no longer have allotments to graze, one member that would have grazing allotments reduced by 65 percent, and one member that would be minimally impacted.

The TBGA permits each of its members to graze in various allotments. When USFS lands are withdrawn from grazing use for any reason, including coal mining, the AUMs are removed from the member's permit since they can no longer graze the area. While the TBGA could potentially provide relief to some of its members through the possible allocation of other vacant allotments if they are available, TBGA cannot totally recover these losses. Often, lost AUMs ultimately result in a net loss to the member and the TBGA and negatively impact the ranchers that were allotted those AUMs for their livestock operations.

Since the onset of mining in this portion of the Powder River Basin, approximately 44,000 acres of federal surface administered by the USFS within 20 allotments have been impacted by coal mining operations. This has resulted in a loss of approximately 10,200 AUMs from the TBGA. Cumulatively, with losses from previous mining activities and these proposed leases, the TBGA grazing agreement could potentially be reduced by approximately 13,090 AUMs, or 18 percent.

As previously described, for five TBGA members, the loss of TBNG grazing use due to the Wright Area LBAs could seriously impact their livestock operations and family ranches. A potential solution to help mitigate adverse effects would be for the TBGA, its affected members, USFS, and the mine operators to partner and collaborate in addressing this issue and begin to develop potential solutions as a consolidated stakeholder group. Also, it might be possible for the affected ranchers to work with one or more of the mines to arrange for grazing on reclaimed mine lands.

As described in Section 1.6, USFS is a cooperating agency on this EIS and must consent to leasing the federal coal underlying lands that they administer before BLM can include those

lands in a decision to hold a federal coal lease sale. The USFS will issue their own separate record of decision (ROD) regarding their potential consent to lease those lands. A decision to consent to lease USFS lands can be appealed within 45 days from the date that the Notice of Publication of USFS ROD is published in the Laramie Boomerang.

**Comment Response 55:** Please refer to Figure 1-1 or F-1 in the EIS. The mines south and east of Wright do indeed include the three applicant mines (Black Thunder, Jacobs Ranch, and North Antelope Rochelle); however, both the Antelope Mine and North Rochelle Mine (which no longer has an active air quality permit, and its federal coal leases are now owned by Ark Land Company and BTU Western Resources, Inc.) are also included.

Section 3.4 and the Supplemental Air Quality Information appendix (Appendix F) have been updated and revised for the Final EIS. Appendix F in the Final EIS states "… 29 of the 33 valid exceedances (those not considered exceptional events under the NEAP) of the 24-hour $PM_{10}$ standard that have occurred in the PRB through 2009 have been recorded by the group of mines located south and east of the town of Wright; the remaining four exceedances occurred in the group of mines located north of Gillette…" The 29 exceedances did not all occur at the three applicant mines. Please refer to Sections 3.4.2.1, 3.4.2.2.1, 3.4.2.2.1.1, 3.4.2.2.1.2, and 3.4.2.2.1.3 in the Final EIS for an updated accounting of the exceedances that have occurred at each of the three applicant mines. The total number of 24-hour $PM_{10}$ exceedances that have occurred at each of the three applicant mines are also disclosed in the Executive Summary.

Through 2009 there have been no exceedances of the annual $PM_{10}$ standards at all three applicant mines. Through 2009 there have been a total of eight 24-hour $PM_{10}$ exceedances documented at the Black Thunder Mine (six of which occurred prior to 2007 and one was designated as a high wind event under the NEAP). Through 2009 there have been a total of four 24-hour $PM_{10}$ exceedances documented at the North Antelope Rochelle mine (two of which occurred prior to 2007 and two were designated as a high wind event under the NEAP). Through 2009 there has been one 24-hour $PM_{10}$ exceedance documented at the Jacobs Ranch Mine (which occurred prior to 2007).

In summary, since the three applicant mines have been in existence and monitoring the particulates and reporting the results to the WDEQ/AQD, a total of 13 24-hour $PM_{10}$ exceedances are on record, three of which were designated as being caused by high wind events under the NEAP. Nine of the other 10 exceedances occurred prior to 2007 and DEQ acknowledges that most of those could have qualified as being the result of high wind events under the NEAP.

**Comment Response 56:** Table F-1 and Table 3-8 have been updated and revised for the Final EIS. The background concentrations for particulates ($PM_{10}$ and $PM_{2.5}$) are based on data collected at the Jacobs Ranch and Black Thunder mines in 2005 through 2008. Please refer to the explanation of how those values were determined in the tables' footnotes.

Please see Section 3.4.2.2.1 and Appendix F for the discussion on air quality modeling for the three existing applicant mine operations. Due to the similarities in mining rates and mining operations, the potential impacts of mining the LBA tracts have been inferred from the projected impacts of mining the existing coal leases as currently permitted. The applicant mines' current air quality permit modeling results agree favorably with the historical monitoring data recorded by them. If the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines acquire the LBA tracts, they will have to amend their current air quality permits to include the new leases before mining activities can proceed into the new lease areas. New air quality modeling would need to be conducted in support of that permit application demonstrating on-going compliance with all applicable ambient standards.

**Comment Response 57:** WDEQ/AQD's Natural Events Action Plan states that "all coal mines in the Wyoming PRB employ Best Available Control Technology (BACT). This Natural Events Action Plan for the Powder River Basin identifies BACT measures in place as the result of existing permit requirements, additional potential control measures identified as BACM, and reactionary control measures directed at transient problem sites that may be implemented during Natural Events. Implementation of BACT, BACM, and reactionary control measures will assure that anthropogenic dust emissions from the coal mines in the PRB are controlled to the greatest extent possible. The goal is to protect public health and to minimize exceedances of the $PM_{10}$ NAAQS through the continued implementation of BACT, and implementation of BACM and reactionary control measures."

WDEQ does conduct regularly scheduled mine inspections. The control measures identified as BACM that are employed at each of the mines are directed at transient problem areas or sites that are unique to the particular operation and are typically action measures rather than devices or installations. However, the actions employed by the mines during "natural events" can be observed and noted during the agency's inspections. Included in Section F-2.8 of Appendix F, we describe Wyoming's NEAP, including two lists of control measures designed to prevent exceedances during high wind events. Included are the measures that the mines can implement continuously so that they are in place before a high wind event occurs. These measures primarily address the principal mine-controlled sources of fugitive dust, which are large contiguous disturbed areas. The second list is an additional category of control measures that include actions that can be taken during a high wind event, depending on site specific conditions. The implementation of BACT, BACM, and reactionary control measures assure that anthropogenic dust emissions from the coal mines in the PRB are controlled to the greatest extent possible.

**Comment Response 58:** The applicant mines' current air quality permit modeling results agree with the historical recorded monitoring data. As such, the mines' BACT requirements for particulates have been effective at protecting the NAAQS, and the EIS provides all of the information necessary to demonstrate compliance with BLM FLPMA obligations. In addition, the EIS states that if the Black Thunder, Jacobs Ranch, and North Antelope Rochelle mines acquire the LBA tracts, they will have to amend their current air quality permits to include the new leases before mining activities could proceed into the new lease areas. New air quality

modeling would need to be conducted in support of the permit application demonstrating on-going compliance with all applicable ambient standards.

**Comment Response 59:** Section 3.4.3 (Emissions of Nitrogen Oxides and Ozone) has been updated and revised in the Final EIS. The EIS discloses all possible sources for these gas emissions and the monitoring efforts of the WDEQ in the PRB.

The EIS states that "ozone monitoring is not required by WDEQ at the PRB coal mines, but levels have been monitored by WDEQ/AQD at its ambient air quality monitoring sites in the PRB since 2001." An exceedance of the $O_3$ 8-hour standard occurs if the 4th-highest daily maximum value is above the level of the standard. Table 3-9 shows that no exceedances of the $O_3$ standard have occurred at either of the two monitoring sites when evaluated under the standard in place at the time the values were recorded. If the strengthened 2008 standard was applied retroactively, one exceedance would have occurred in 2003 at the Campbell County site. The EIS discloses that BLM expects a stricter $O_3$ standard of between 0.06 and 0.07 ppm to be announced in August 2010.

Your comment claims that ozone levels in the PRB are trending upward. BLM cannot make that assertion based on the limited data that are currently available, both temporarily and spatially, for the PRB. For example, sans the statistical trend analyses demonstrated by WildEarth's comment, the highest recorded value occurred in 2003; seven years in the past. Additional data from these two sites and preferably a larger ozone air quality monitoring network that covers more of the basin are needed before any trends can be clearly defined.

**Comment Response 60:** Based on data collected at WDEQ's Campbell County ozone monitoring site from 2005 through 2008, we have updated the Final EIS to include the background ozone level as 133 $\mu g/m^3$ (0.057 ppm) in Table 3-8 and F-1.

WDEQ does not currently require ozone monitoring or modeling by the PRB coal mines. Therefore, the applicant mines' current air quality permits do not address impacts to the ozone standards, and as stated in the response to WildEarth's prior comment (4a), ozone monitoring data for the eastern PRB are limited. BLM has disclosed the sources of ozone emissions from the mining operations and the environmental consequences related to it.

Note that on January 6, 2010, EPA proposed to strengthen the NAAQS for ground-level ozone. EPA is proposing to strengthen the 8-hour "primary" ozone standard to a level within the range of 0.060-0.070 ppm. For the primary standard, ozone concentrations are averaged over 8-hour periods. The fourth highest 8-hour value at a particular monitor in the most recent year is averaged with the fourth-highest 8-hour values from the previous 2 years. This produces a 3-year average. To meet the standard, the 3-year average must be less than or equal to the level of the standard. In light of EPA's proposed ozone standard, additional ozone monitors would be needed in the PRB before a quantitative assessment of ozone impacts in the PRB could be made. EPA is considering comments received on the proposed monitoring requirements and plans to issue a final rule in coordination with the final ozone standards in August 2010.

The BLM as well as WDEQ recognize that ozone levels in the state are a serious concern. WDEQ operates and maintains a network of ambient air quality monitors to determine compliance with the NAAQS. When areas do not meet the NAAQS, WDEQ performs special monitoring studies, such as that which is ongoing in the Upper Green River Basin, to better understand ozone formation.

**Comment Response 61:** Ground-level ozone is not emitted directly into the air, but is created by sources of $NO_X$, which in the presence of volatile organic compounds (VOCs) reacts to form ground-level ozone. Therefore, the statement that is made in the EIS that measures to reduce mine-related $NO_X$ emissions should also reduce the potential for the formation of ground-level $O_3$ in the PRB is entirely reasonable.

**Comment Response 62:** The cumulative air quality effects analysis in Section 4.2.3 has been updated and revised in the Final EIS.

BLM updated the air quality model and cumulative impact analysis for the year 2020 using 2004 as the baseline year with revised 2020 coal production scenarios, based on the PRB Coal Review Task 3A Report update. The analysis specifically looked at impacts of coal mines, power plants, CBNG development, and other development activities. The revised baseline year emissions inventory was developed using 2004 actual emissions data or emissions estimates and incorporated the recent analyses of emissions in Wyoming and Montana that were not available when the previous modeling was done.

Two of the reservations noted in your comment are located within the PRB: the Northern Cheyenne Indian Reservation, which is designated as a PSD Class I area, and the Crow Indian Reservation, which is designated as a PSD Class II area. The Northern Cheyenne Reservation is located 13 miles from the Colstrip Power Plant and the Rosebud surface coal mine, and 10 miles from the Absaloka surface coal mine. The Crow Reservation actually borders the Absaloka surface coal mine. These two reservations are approximately 130 miles north of the general Wright analysis area. The Wright EIS general analysis area is located about 330 miles away from the Fort Belknap Reservation and about 140 miles from the Wind River Reservation; both of these reservations are designated as PSD Class II areas. The modeled impacts to the visibility at these reservations, as shown in Table 4-13 in the EIS, are the cumulative result of all current and projected development activities within the PRB, not just the impacts that would result from the leasing and subsequent mining of the six Wright Area LBA tracts.

Section 3.17.7 in the EIS addresses environmental justice and the impacts related to the proposed leasing of the six Wright Area LBA tracts, not the cumulative impacts from all development within the PRB. Therefore, the analysis in Section 3.17.7 is limited to Campbell County. The cumulative visibility impacts resulting from all projected development within the PRB would be no more acute for Native American populations than for the general public.

**Comment Response 63:** Thank you for your comment. We have revised the Final EIS to incorporate additional information regarding paleontological and cultural resources in the Wright EIS general analysis area.

We have added the Rockpile Museum in Gillette to the BLM High Plains District coal EIS mailing list. The museum will receive all future BLM Wyoming PRB federal coal environmental impact statements.

As is BLM policy, a survey of the lands being considered for federal coal leasing must be surveyed for historical and archeological sites and artifacts in advance of leasing. These surveys are typically completed by consulting firms approved and/or permitted by the Forest Service (USFS) or BLM. Agency approval allows them to conduct surveys on lands administered by either of these agencies, and sets professional and technical standards for their work.

Based on the survey report findings, the BLM or USFS then consults with the Wyoming State Historic Preservation Office (SHPO) regarding the significance of sites discovered and the eligibility of those sites for the National Register of Historic Places. If the lands are leased, the WDEQ, the agency that permits coal mining, will require that a plan be developed to mitigate (generally by avoiding or excavating and recording) each eligible site. WDEQ will enforce this plan as a condition of the mining permit.

The cultural survey reports include specific location and content information for each site found. This information is confidential under the National Historic Preservation Act. The consultant, federal agency, and SHPO are all prohibited from public release of this information. It might be possible for the Rockpile Museum to enter into a formal data sharing agreement with the agencies where specific information could potentially be shared. The Museum would be under the same public release prohibitions as the other agencies.

Paleontological surveys of the lands being considered for federal coal leasing are undertaken to locate, identify, and document paleontological resources that might be affected, and to provide recommendations of management/mitigation for identified paleontological resources. Like the cultural resource surveys, these surveys are completed by qualified consulting firms that are approved to conduct surveys on public lands administered by the federal land management agency.

Potentially significant fossil specimens exposed on the surface have been collected and reposited with the Denver Museum of Natural History to prevent data loss. The qualified paleontologists who conducted the field survey may recommend that mitigation efforts be conducted to determine if additional buried material is present, and to then collect any scientifically significant specimens.

BLM will attach a stipulation to each lease requiring the operator to report significant paleontological finds to the authorized federal agency and suspend production in the vicinity of a find until an approved paleontologist can evaluate the paleontological resource.

**Comment Response 64:** We have added your name to the BLM High Plains District coal EIS mailing list. You will receive all future BLM Wyoming PRB federal coal environmental impact statements.

Figure 4-5 in the Final EIS does not represent current conditions, but rather, it depicts the areal extent of groundwater level drawdown within the Wyodak coal seam aquifer that would be expected to occur as a result of all mining activity in the Wright Area should all six of the Wright Area LBA tracts be leased and mined. The five-foot drawdown limit shown in Figure 4-5 extends west beyond the Turner Ranch on Bates Creek. However, groundwater level drawdowns in the coal seam aquifer that are due to mine pit dewatering have been completely overshadowed by the dewatering effects on the coal seam aquifer as a result of coal bed natural gas (CBNG) development in this area. It is very unlikely that mine pit dewatering alone has had or will have any measurable effect on the Wyodak coal seam aquifer as far west as the Turner Ranch on Bates Creek.

The statement in Section 3.5.2.1 that "springs are uncommon and none have been identified within the general analysis areas of these six LBA tracts" is factual. It is unclear but assumed the springs that you refer to in your comment are located within the Bates Creek watershed. Bates Creek is a major tributary of Antelope Creek, and the mouth of Bates Creek is located roughly 10 miles southwest of the western edge of the South Porcupine LBA Tract, the closest of the six Wright Area LBA tracts to Bates Creek.

The Final EIS has been updated to include the results of BLM's regional groundwater flow model, which illustrates the areal extent and degree of drawdown that is associated with the mining operations and the CBNG development operations in the PRB. The groundwater flow model used in this NEPA analysis is included in BLM's PRB Coal Review Task 3B Report. The PRB Coal Review is used by BLM to evaluate the cumulative impacts of leasing federal coal in the PRB. The groundwater model and its results are described in detail in the Task 3B Report and can be reviewed on the BLM High Plains District website. Figures depicting the effects of coal mine-related dewatering only and CBNG development-related dewatering only are included in the Final EIS; these data indicate that the effects of mine dewatering have not and will not in the future extend to the west far enough to effect groundwater resources in the Bates Creek watershed.

The springs that you describe in your comment are much removed from the general Wright analysis area; therefore, the past and present hydrogeologic conditions responsible for these once-significant springs and their demise were not investigated in detail in this EIS. However, based on the general hydrologic characteristics of the geologic units that occur in the eastern part of the PRB, it is reasonable to assume that the springs were and are presently associated with a shallow groundwater source, such as recent alluvial deposits or possibly the Wasatch Formation, rather than a deep groundwater source, such as the Wyodak coal seam.

Springs and seeps do not commonly occur within the PRB due to many factors, including the semi-arid climate and the lithologic characteristics of the shallow geologic units that crop out on the surface of the basin. In general, springs and seeps that occur within the drainages of the PRB are typically associated with shallow groundwater that is stored in the streams' recent alluvial

deposits. Determining the cause of the changes to the "spring holes" on Bates Creek that you have witnessed is beyond the scope of this EIS. However, if these springs are indeed associated with shallow Bates Creek alluvial groundwater, those changes may be the result of changes that have occurred to the stream's hydrologic flow regime, which could be the result of the extreme drought conditions that have prevailed in the PRB since 1999.

We encourage you to advise the BLM High Plains District Office in Casper of the spring locations so that they can be included in the administrative record for this EIS. Those locations should be made available to the WDEQ as well. If nearby lands are leased for coal in the future, their locations should be made available to the coal lessee for study purposes.

Twenty-eight wells have been installed in the backfill at the North Antelope Rochelle Mine to monitor water levels and water quality. As required by the WDEQ, the mine also monitors water levels and water quality in many wells that are completed in the water-bearing units that are affected by mining, including alluvial deposits, clinker deposits, Wasatch overburden strata, Fort Union coal beds, and underburden strata. The monitor well you cite (PRCC-21B) is a WDEQ required monitor well. Monitoring data and other required information, such as the well's completion record, is reported to WDEQ by the mine operator. We understand that this data is made available to the public, and the WDEQ/LQD office, either in Sheridan or Cheyenne, should be able to assist you with locating all the information on this or any of the mine's other monitoring wells. It should be noted that it is unlikely a well used for stock watering would also be used by a mine as a monitoring well due to the fact that its water level would be greatly affected by pumping, negating its usefulness to monitor the effects of mine-related dewatering and drawdown.

**Comment Response 65:** Mining companies restrict access to their permitted lands as a safety precaution. There are dangers on mine sites; companies control visitors to protect the public's safety and prevent accidents. However, the controlled mine areas should be well posted to prevent the public from accidently entering these areas. Please contact the mine company regarding your access to grazing areas and any affiliated problems that may have arisen regarding their employees' conduct and customer service. It is our understanding that all of the PRB mines continue to welcome visitors and will gladly conduct tours of their operations provided that they are contacted in advance of your visit.

**Comment Response 66:** Thank you for your comment. We have updated and revised Section 3.5.1.2.1.1 (North, South, and West Hilight Field LBA Tracts), Section 3.5.1.2.1.2 (West Jacobs Ranch LBA Tract), and Section 3.5.1.2.1.3 (North and South Porcupine LBA Tracts) in the Final EIS. We revised the discussions on identifying and predicting the extent of drawdown in the Wyodak coal aquifer that is specifically attributable to mine dewatering.

**Comment Response 67:** The Biological Assessment (Appendix G) has been revised extensively for the Final EIS. A discussion on the location and extent of the potential wetland areas was added for each LBA tract including separate maps to depict those areas within the respective

tract's general analysis area. Also added were more detailed descriptions of each tract's existing environments and the potentially suitable habitats for each listed species. Dates of all surveys conducted for ULTs are provided in the EIS.

**Comment Response 68:** Previous surveys for ULT have been conducted within the adjacent mines' existing permit areas in order to evaluate the potential effects of leasing federal coal reserves within those areas and are contained within the respective BLM EIS documents. References are made to those sources in Appendix G including the survey dates, surveyors' names, and results.

**Comment Response 69:** The Biological Assessment (Appendix G) has been revised extensively for the Final EIS. Appendix G states that all potentially suitable habitat within the general analysis area of each LBA tract will be surveyed for ULT three consecutive years during the plant's flowering period in order to determine the presence of the species prior to any surface disturbing activities.

BLM's and USFS's special coal lease stipulations are identified in Appendix D of the Final EIS and they include a threatened, endangered, candidate, or other special status plant and animal special stipulation. This stipulation was developed in concert with USFWS and specifically states, "Any potential habitat that has not already been surveyed for Ute ladies'-tresses within the project area shall be identified and surveyed prior to surface mining activities."

**Comment Response 70:** The Biological Assessment (Appendix G) has been revised extensively for the Final EIS. Further analysis determined that no suitable habitat for blowout penstemon is present within the general analysis areas of the six Wright Area LBA tracts; Appendix G has been revised to clarify that finding. BLM's and USFS's special coal lease stipulations are identified in Appendix D of the Final EIS. The threatened, endangered, candidate, or other special status plant and animal species coal lease stipulation that was developed in concert with the USFWS is included. With the guidance and support of USFWS, wildlife mitigation measures will also be prescribed at the permitting stage.

**Comment Response 71:** Thank you for your comment. We revised Section 3.12 in the Final EIS to include additional information regarding cultural resources. BLM initiated Native American consultation with the tribes on December 16, 2008 in regard to the Wright Area EIS. Preliminary analysis of the Class III inventories associated with the six Wright Area LBA coal tracts indicates that there are likely archeological sites that may be of tribal significance. Once the Class III inventories are fully analyzed, BLM will consult the tribes in accordance with the National Historic Preservation Act regulations. Because there are numerous cultural resources in the Wright EIS general analysis area, BLM will conduct site-specific tribal consultation individually on each lease. BLM will consult with the Cheyenne River Sioux Tribe, and other tribes, in relation to the specific culturally significant areas that are located within the Wright EIS general analysis area beginning in the summer or fall of 2010.

**Comment Response 72:** We revised and updated Section 3.3.2.1 and 3.3.2.2 in the Final EIS to include additional information regarding the different forms of modern unconventional development of "continuous" hydrocarbon accumulations, including tight sand and shale gas.

In the Final EIS, we added a new subsection to the unconventional oil and gas analysis (Section 3.3.2.1.2) in order to address the potential for the development of continuous oil and gas resources in the PRB. Subsection 3.3.2.1.2.1 addresses CBNG production in the PRB and in the general Wright analysis area.

In addition, the potential impacts of coal leasing upon both conventional and unconventional oil and gas development in the PRB and general Wright analysis area have been added to Section 3.3.2.2 in the Final EIS. A discussion covering secondary recovery methods used to enhance production from old fields with declining production has also been included in the conventional oil and gas resources section (3.3.2.1.1), as was the potential for increased conventional oil and gas exploration due to increased prices.

The development of natural gas from hydrocarbon rich shale and tight sand formations is a very recent phenomenon in the oil and gas industry. The industry's ability to drill and complete wells that are capable of tapping these unconventional hydrocarbon resources is largely due to evolving state-of-the-art directional drilling and new formation fracturing technology. As discussed in the Final EIS, the oil and gas industry has only recently begun to explore the potential proficiency and feasibility of developing these continuous hydrocarbon resources in the PRB.

**Summary of the Wright Area Coal Lease Applications Draft EIS Public Hearing**

Two statements were given as testimony at the Wright Area Coal Lease Applications Draft EIS Public Hearing held on July 29, 2009 in Gillette, Wyoming. The complete transcript is available for public review at the BLM High Plains District Office in Casper.

Shannon Anderson, speaking on behalf of the Powder River Basin Resource Council (PRBRC), described a number of the group's concerns in regard to Powder River Basin coal mining including reclamation, groundwater impacts, and loss of wildlife habitat and livestock grazing areas. Ms. Anderson's testimony highlighted the formal comment letter that was submitted to BLM by the PRBRC during the Draft EIS public comment period. Their letter is included in this appendix.

Brad Mohrmann delivered testimony as a Sierra Club representative. Mr. Mohrmann asked the BLM to consider several issues including whether federal coal should currently be leased in light of the slow economy, decline in coal production, increased wind power electric generation, and the push to generate clean renewable energy. Concerns with reclamation, bonding, new climate change legislation, and the economics of leasing coal at this time were also presented.